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"THE LURE OF LAKE LOUISE AT DAWN"

Copyrighted by Leonard M. Davis

Typical of the beauty of the Canadian Rockies.—This painting is one of a series of canvases by Leonard M. Davis, which will be on exhibition at the American Museum until June 1.

—See note regarding the exhibition, page 111

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China's Ancient Monuments*

By ROY CHAPMAN ANDREWS

Illustrations from photographs by the Author

A MEMORIAL was addressed to President Yuan Shi Kai of the Chinese Republic in 1914 by fifty-two American institutions of art, learning, and humanity.¹ The immediate result was the promulgation of an edict making legal recognition of China's monuments and antiquities and urging national coöperation in their preservation. Moreover, the governments of the United States, Great Britain, and France through their ministers at Peking instructed their consuls throughout China to use all possible endeavors to further the suppression of vandalism on the part of their citizens.

Although this was an excellent beginning, political events soon gave it an unexpected check. Within little more than a year Yuan Shi Kai's monarchical ambitions were made public, and a rebellion immediately started which involved all China and resulted in the death of Yuan. Since then the republic has been in chaos or has, to say the least, maintained a state of unstable equilibrium. Meanwhile the despoiling of China's monuments and antiquities has progressed unchecked. In the last ten years foreign collectors have visited

many remote corners of the eighteen provinces on a systematic search for objects of art or archaeological value, and the menace to the records of China's ancient civilization has assumed alarming proportions.

Not only have smaller objects been carried away but pieces of sculpture, bas-reliefs, and parts of temples too large for ready transportation have been cut from their places and sometimes irreparably broken, leaving a scarred and disfigured reminder of ancient glories. Unfortunately this work of despoliation has been aided only too effectually by certain unscrupulous Chinese themselves who saw an opportunity for material gains in the plunder of the art treasures of their own country. Moreover, China is doing very little toward protecting the monuments and buildings which form not only the record of her own ancient civilization but which are of the utmost importance in the history of the world.

The Chinese are great builders, but they seldom repair the monuments which they have erected. In Peking, one of the most unique, picturesque, and romantic cities of the world, there are dozens of ancient buildings which form a precious heritage of the Chinese people and as such should be cared for

¹ This was after an energetic campaign by Frederick McCormick, secretary of the Asiatic Institute, in which Professor Henry Fairfield Osborn took an active part on behalf of the American Museum of Natural History.

* As stated in a note in the February JOURNAL, a joint meeting of the American Scenic and Historic Preservation Society and the American Museum of Natural History was held on January 17, 1918. A resolution, introduced by Professor Henry Fairfield Osborn, was unanimously adopted by the members of the two institutions, extending to the President of the Republic of China felicitations upon the plans that have been made for the protection of Chinese monuments and antiquities from vandals and for the collection of these priceless relics of the history of China, and renewing the expression of hope that these collections may be safely preserved in a national museum. The resolution also renewed the pledge that our influence will be used to prevent the despoiling of China by the unauthorized sale of ancient works of art.

by the nation. The Temple of Heaven, with its golden dome glowing like a great ball of fire above the purple tiles of its sloping roof, the white marble altar open to the sky, made sacred by the worship of China's most illustrious emperors, the beautiful *p'ai lou*, and the marble walks belong to China's posterity as records of her ancient glories. But such rare treasures need care to protect them from the ravages of time and weather.

When I visited the Temple of Heaven less than two years ago, I found its spacious courtyard choked with uncut grass and its beautiful walks and tile-capped walls almost obscured by growing weeds. The tiny roots were slowly but surely accomplishing their deadly work. The marble slabs were cracked, the tiles broken, and the walls crumbling; the great round temple itself was filled with dust and decay. In a very few decades this almost sacred spot will present only a heap of ruins overgrown with grass and weeds, and one more page will have been torn from the book of China's history.

The "Yellow Temple," not far from Peking, is one of the most sacred spots near the capital. Here are buried the garments of a holy Tashi lama who came as an ambassador from Tibet to Peking. It was the lama Panchan Bogdo from Tashi Lumpo, who died of smallpox in 1870. The ashes of his cremated corpse were sent to Tibet, but over his clothes the artist emperor, Ch'ien Lung, erected a *stûpa* in old Hindu style, a mausoleum of marble and gold. When I visited it first, in 1912, a yellow-robed priest showed me, with sorrow in his eyes, the atrocious destruction which had been inflicted on this sacred monument in 1900. This was during the Boxer Rebellion, when Japanese soldiers wantonly knocked off the heads of statues with the butts



of their rifles and damaged bas-reliefs, but fortunately only a small part of the marvelous detail was destroyed by this act of vandalism.

On my second visit, in 1916, after an absence of four years, I was appalled at the signs of decay. The ancient temple of gray wood, with faded but magnificent columns, yellow, blue, and green, was full of cracks and rifts. It was already leaning and seemed about to fall. In place of a beautiful *p'ai lou* which formerly faced the *stûpa*, lay a heap of plaster, stone, and yellow tile. It is a very, very old temple but with a little care could still be made to stand for years.

At the end of Ha-ta mên street are the "Temple of Confucius" and the



View from the porch of the main temple at the Ming tombs. These temples and tombs, among the most interesting in China, with only a small amount of care could be preserved for many years. Note the thick vegetation growing among the broken tiles of the roof

"Hall of Classics." One passes through a little door in the wall and enters a quiet courtyard full of trees, some of which were planted a thousand years ago under the Sung dynasty and, although twisted and wrinkled, are still stately and dignified like ancient sages.

Near a large wooden gate are ten curious old stones about three feet high. They are the holy drums of the Chou dynasty and are 2700 years old. Although priceless relics of antiquity, they remain outside, open to the ravages of cold and heat, of frost and rain. In the temple is the wooden soul-tablet of Confucius and in adjoining buildings

are tablets of many disciples and pupils of the master.

The Hall of Classics is a group of temple-like buildings in a large garden where the text of Chinese classics is kept engraved on stone tablets. There is a wonderful *p'ai lou*, and in the center of a beautiful lake surrounded by a marble balustrade stands a splendid temple. It is the "Hall of Meditation," but now is deserted and covered with dust; dust is everywhere, blown in from the Gobi desert by whirlwinds from the north. The fine desert sand is powdered thickly over the stately throne and paneled screen, and has dulled the



Stone tablets at the entrance to the Temple of Confucius.—Upon these great slabs of stone are cut many of the Confucian classics. They are of great value and should be carefully housed instead of being left to the destructive action of heat and cold. China should have an active society—an Archaeological Survey—financed by the government and administered by trained men, to guard and keep in repair her ancient monuments, and thus preserve for the benefit of posterity priceless treasures of art and antiquity



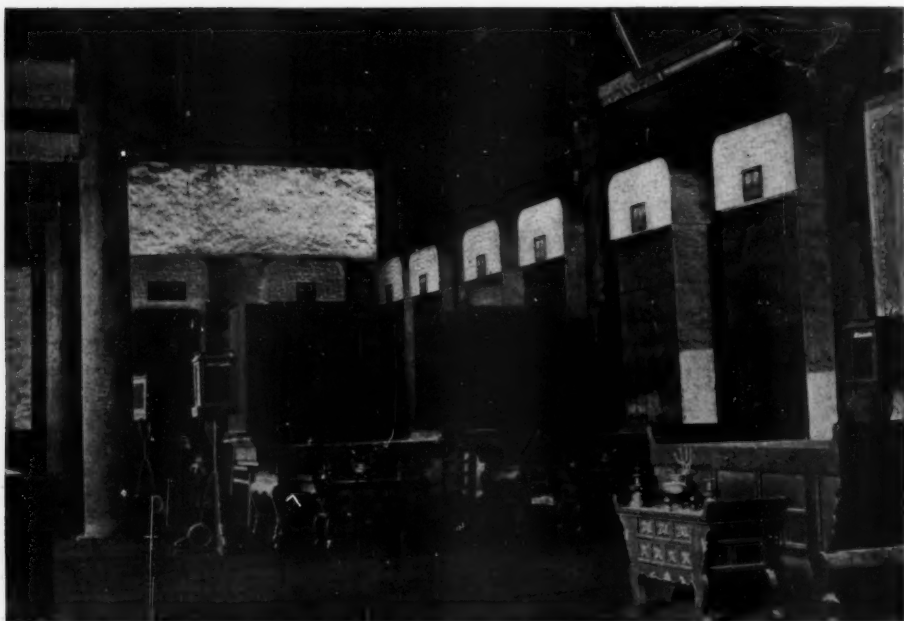
Marble bridge at the Ming tombs.—The bridge has been broken away at the end and within a few years will be entirely destroyed unless some action is taken to preserve it



P'ai lou in the courtyard of the Hall of Classics.—An atmosphere of neglect, decay, and dilapidation rests on the temple, creating in all observers a feeling of sadness that so much beauty is left to perish



One of the buildings of the Confucian temple.—Weed-grown terraces, crumbling stairways, and falling walls are now characteristic of these splendid temples



Interior of a Confucian temple.—Dust is everywhere—blown in from the Gobi desert by whirlwinds from the north. Stately throne and paneled screen are covered thickly with the fine desert sand, which has dulled the color of the red-lacquered wood and golden ornaments

color of the red-lacquered wood and golden ornaments. In other halls stand classical texts engraved on stone, but between the sacred tablets are piles of boards and benches. An atmosphere of neglect, decay, and dilapidation rests on the Temple of Confucius. Not only is the material dust of the Gobi desert sprinkled over it, but something like mental dust as well, and one leaves it with a feeling of sadness that China's most precious treasures of wisdom and beauty are left untended to perish from the earth.

A few hours' ride on the railroad brings one to Nank'ou and the Ming tombs. At the entrance to the valley in which lie the mortal remains of the great emperors stands a noble *p'ai lou*, one of the most beautiful in China. A magnificent road, once paved with marble slabs but now a crumbling ruin grown thick with weeds and grass, leads through waving fields of corn. Passing down the "Avenue of the Ani-

mals," where in huge marble figures, standing and recumbent, all the creatures of the earth are symbolized in mourning for the emperors, one arrives at a shallow stream once spanned by a beautiful marble bridge. This bridge, too, is in ruins, and at the splendid temples and tombs beyond one finds falling walls, weed-grown terraces, and crumbling stairways.

Throughout the length and breadth of China the picture is the same—relics priceless to history and to science neglected and crumbling in decay for want of the care which every civilized nation of the earth lavishes upon the records of its antiquity. Fortunately, the story is different in Japan, where the temples and monuments are cared for by the nation and its people and stand today as permanent memorials of her ancient civilization. In the "Society for Preserving Landscapes and Historic and Natural Monuments" Japan has a custodian for her national



MAUSOLEUM NEAR PEKING

Although the Chinese are great builders, the architecture of China is little known and its history is yet to be written. Upward curving roofs, octagonal towers, and painting in strong pure colors are recognized elements. This *stûpa*, or mausoleum of marble and gold, was built in memory of the lama Panchan Bogdo from Tashi Lumpo, who died in 1870. The bas-reliefs were badly injured by Japanese soldiers at the time of the Boxer Rebellion in 1900



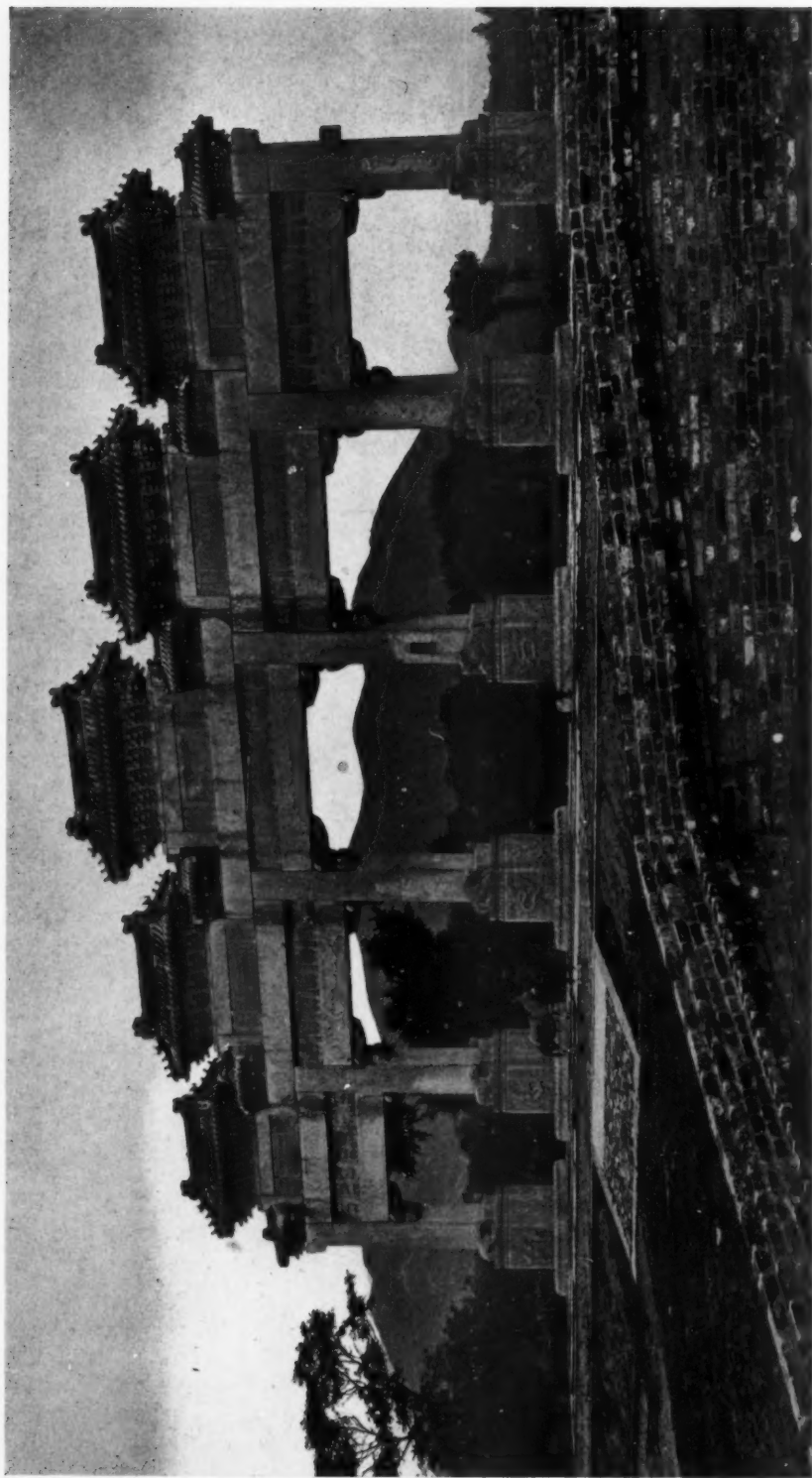
THE TEMPLE OF HEAVEN

This temple, one of the most beautiful in China with its golden dome, purple-tiled roof, and white marble altar, is being rapidly destroyed by the ravages of neglect and decay. In a very few decades it will present only a grass-grown heap of ruins. The beautiful marble walks and *pai lou* are overgrown with weeds. At the open altar from which this photograph was taken the emperor formerly worshiped once each year



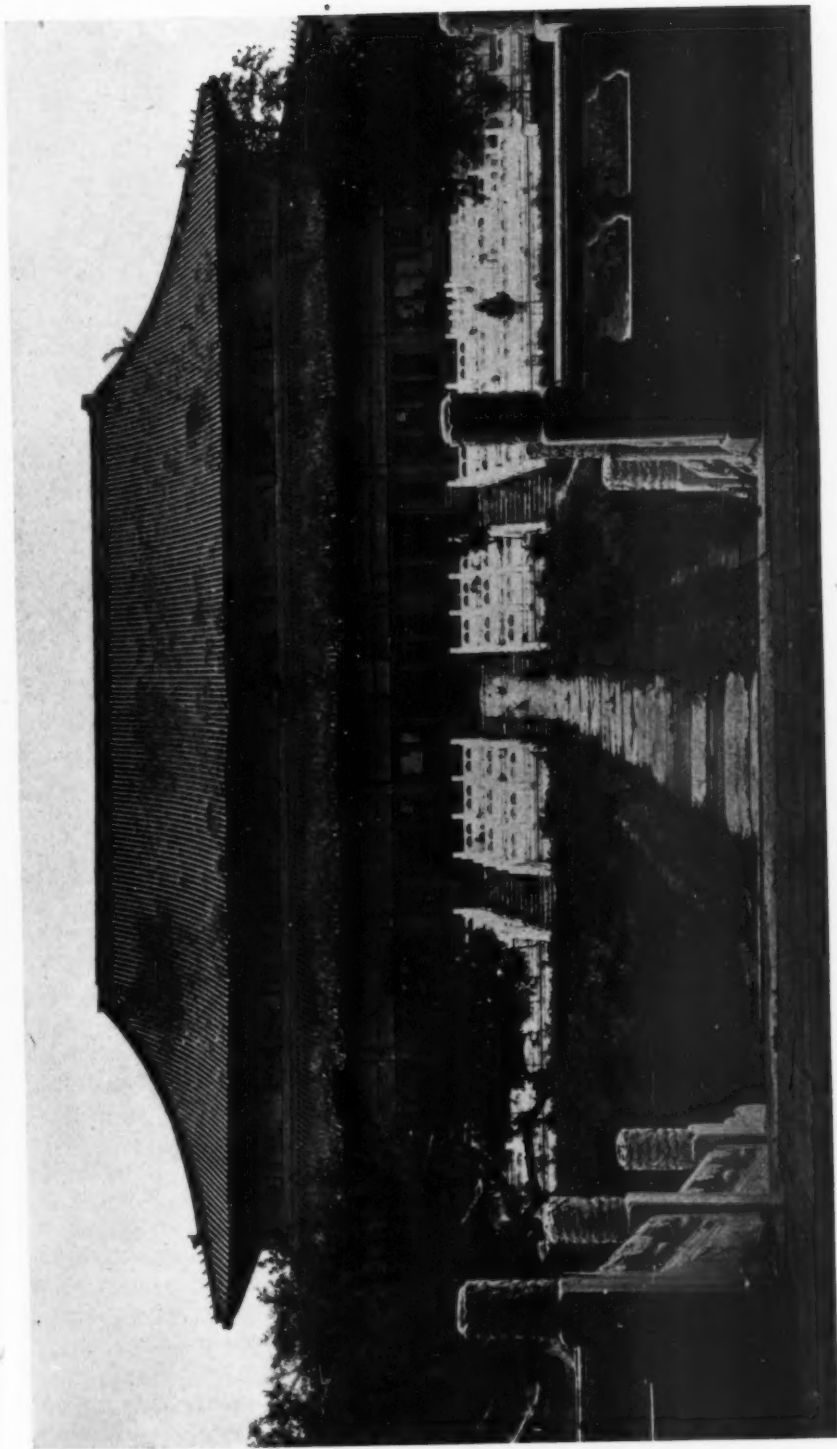
AVENUE OF THE ANIMALS AT THE MING TOMBS

A magnificent road, once paved with marble slabs but now crumbling and overgrown with weeds and grass, leads into the valley where lie the mortal remains of these great emperors of China. Huge marble figures, standing and recumbent, border this road, to symbolize all creatures of the earth mourning for the emperors. Throughout the length and breadth of China the picture is the same—priceless relics crumbling in decay for want of that care which every civilized nation lavishes upon the records of antiquity.



P'AI LOU AT THE ENTRANCE TO THE VALLEY OF THE MING TOMBS

This is one of the most beautiful *pai lou*s in all China and it is now in a fairly good state of preservation; but the roads leading to the temples, and the buildings themselves, are rapidly yielding to the destructive forces of wind, weather, and weeds. Prompt attention would save this monument from the fate that has befallen many such landmarks of China



AT THE END OF THE ROAD

The Avenue of the Animals leads to this once fine temple, which now speaks eloquently of the inroads made by time and neglect. Vegetation springs freely amid the stone flags of the pavement and is rapidly breaking away the tiled roof of the temple itself. Falling walls and crumbling stairways characterize the interior, which keeps pace with the rest in its general aspect of desolation

treasures and a safeguard of her history. China should have a similar active society to protect, care for, and repair her buildings, monuments, and antiquities. She needs an Archaeological Survey, financed by the government and administered by trained men, to locate and appraise her scientific treasures and to undertake the establishment of national and provincial museums where her priceless objects of art and antiquity can find a permanent resting

place and be open to exhibition and study.

In this period of transition China's peril is great. She must awake to save the memorials of her ancient civilization or they will be stolen from her by ruthless vandals, bartered to enrich the coffers of soulless traders, and the records of her glorious past will lie in crumbling walls and heaps of dust.¹

¹ See *American Museum Journal*, Vol. XVI, pp. 109-112, and Vol. XVII, pp. 525 and 530 for further illustrations of Chinese monuments photographed by Mr. Andrews.



Gate at the old city of Tali-fu in Yunnan.—Marco Polo passed through this gate about the year 1284. The famous traveler visited China during the reign of Kublai Kahn, and it is mainly to his book of recollections that Cathay, as the Chinese empire was known to medieval Europe, owed the growing familiarity of its name in Europe during the fourteenth and fifteenth centuries. The Polos were pioneers of a very considerable intercourse between China and Europe, which endured for about half a century, or until the end of the Mongol dynasty. Trees are growing from the upper parts of this historical monument and it soon will be a crumbling ruin.

A Point of View on China¹

By L. H. BAILEY

Formerly Director and Dean of the New York State College of Agriculture, at Cornell University

IT is impossible for me to undertake a positive discussion of the missionary enterprise in China for the reason that I am not a student of the subject nor did I attempt any investigation of it in my brief visit. I went to China for a very different purpose. Yet one who is interested in the problems of the people necessarily must consider the foreign or outside influences, and of these influences the missionary movement has outstanding importance. Moreover, for a short experience, I actually saw much of the missionaries, of different groups and denominations.

I do not approach the subject of the missionaries from what might be called the professional or evangelical side, although in sympathy with this fundamental phase of the work. The social, civic, and other results cannot be overlooked, particularly at a time when China is itself in the flux.

If we are to consider betterments in China, we necessarily assume that the present status of the country is markedly defective. This is naturally an assumption of occidentalism. I do not know how far the Chinese make such assumption, although I was impressed with the readiness with which they invite suggestions and the great courtesy with which they treat the recommendations of foreigners. It seems to be a prevailing opinion that China is closed and sealed to outside influence. This may be true in the sense that China has learned much in her long history and has incorporated this acquisition into her philosophy and institutions, but she is ready for change, and her people, so far as they have had advantages, seemed to me to be eager to take hold of many new things.

In our occidentalism, representing a civilization now expressed in terms of commerce, we are likely to think of China as a heathen land, lacking in the development of natural resources and in the applications of science, weak politically and in education, primitive in sanitation, stationary in agriculture, undeveloped in industry. On these questions I now make neither affirmation nor denial. Yet a few great outstanding considerations must be kept constantly before us.

Bear in mind that I here develop a point of view only. This view is personal to me, representing some of my impressions. It is not my purpose now to state any sets of facts as such. Nor do I overlook the many deficiencies that are so likely to impress the visitor from the West, and which have been so often described. These defects, while inconvenient to the traveler and the business man, do not necessarily express the real capacities or potentialities of the people. China did not impress me as either decadent or worn out, but as arrested.

The history and experience of China stimulate speculation as to its future, and raise certain reflections on our own status. Naturally all such statements as here made are relative; and the queries I propound are only to challenge the westerner, not to express dissent.

First, China is generally considered to be the most permanent society or civilization of great dimensions on the globe. Yet it is not a political or patriotic society in our understanding of these words. Its cohesion is of another kind.

(Query: Is the highly developed nationality of the Occident the solution or even the best expression of human progress?)

¹ Enlarged from an address, by request, before a missionary group.

Second, the increase of population apparently has outrun the available land and the food supply; or, to state the case otherwise, the scale of living has been forced to very low terms. There must be something in the organization of their society highly conducive to race increase; there must be a high essential morality and a governmental system that is on the whole kindly or at least not repressive.

We must be careful not to confound racial customs, particularly in their relations to the sexes, with essential morality.

Third, we must recognize that the Chinese have learned the great art of economical living. They know how to use nourishing vegetable foods to the greatest advantage. The Romans knew the value of pulse. Daniel refused that he and his associates should use King Nebuchadnezzar's meat and the wine he drank, but insisted on the simpler diet of the Israelites; and a test was made to the result that the king's dainties were taken from his own men and they were given pulse to eat. We think of China as a land of rice, but it is also a land of soy, and the odor of the bean curd announces your approach to a village. With all our violent conservation, we are not yet in sight of the Chinese economy; and yet I was impressed with the fact that the Chinese live well in proportion to their incomes. They have food freely, and in surprising variety, although simple among the common folk.

We are to hope that we shall never be driven to the extreme food reductions of the mass of the Chinese people, yet we must recognize their maintenance of population in the face of such reduction; it would be well for us to make more extended studies of their dietaries.

(Query: Have the *chef* and the menu added to the virility of our western people? Most of our people do not have these aids: is there any relation here to the birth rate? Are the

results of our studies of calories anything more than the elimination of materials which over-supplied persons have learned to add to their stomachs?)

Fourth, there is limitless latent power in her population. China is often described as a country of vast potential natural resources; of this I do not know, but I was much impressed with the potentialities of her undeveloped human resources. Here is endless capacity for labor, patience in the face of great difficulties, a reserve force that some day the world may sorely need.

(Query: Do we of the West give too much weight to the development of the individual, as a separate unit? Or is there an evolutionary power in numbers?)

Fifth, China has withstood the shock of invasions from without and of uprisings within. We think of the present war as the most destructive of life in the world's history; yet I have been told that the estimated loss of life in the Tai-ping rebellion and as a result of it (this rebellion ended about the time of our Civil War) was many millions. There must be some powerful principle in the Chinese civilization, some abiding merit in the institutions, to account for these recoveries throughout the centuries. China has recovered by means of her own internal strength without the need of external help. She has not gone forth for to conquer. China has minded her own affairs: among the great self-governing peoples or powers she is peculiar.

Sixth, China is farthest removed from being a military nation. It has been the diversion of the rest of the world to laugh at her army. Yet she has these centuries to her credit. She has maintained herself. The Chinese invented gunpowder. It is said that it was used to drive away the evil spirits. If she had used it to kill her neighbors we should now class her with the Great Powers and probably would not need to send teachers to her.

China is the great example of a country at peace. She has not been tranquil within herself, for it is a mistake, as I see it, to regard China as complacent; but essentially her contact with the world has not been of the conquering-hero kind. I have been interested to see her conquest in the South Seas. A Chinese comes to a place quietly. He asks no favors, no protection of his government; he raises no flag. Presently he has a good business; he makes himself useful; soon he controls important affairs; he conquers the country, but the conquest is not in the name of China. It is a racial conquest. The only way it can be stopped is to prohibit immigration.

China has had the presumption to put the soldier lowest in the social scale, and yet she has persisted longest; this makes her perhaps the most remarkable and the most significant country. Since China began, Greece has finished. Egypt has buried herself in her sands. Alexander the Great has come and gone. Christianity has come. Rome fell. Spain planted her language around the world. Great states have come out of the renaissance; by vast heroics they are trying to keep their heads above water. China is the Great Fact in history. It was a sensation to me to find that her native systems of education are innocent of Greece and Rome.

(Query: Has any continuous military method of civilization justified itself? May we hope for the continued development of a peace-loving China as the greatest safeguard in the world?)

Seventh, China has not had a continuous government. We think of the Chinese monarchies as extensively despotic, yet such is not the case except within rather narrow powers. Life may have been cheap as against the will of dynasties, yet the powers of government have lain largely in the provinces. Dynasties have been short, an average it is said of about two hundred years,

and every succeeding dynasty has been of a different kind and stamp from its predecessor. It is the unwritten law that a dynasty does not write its own history. China has seen marvelous changes of governmental direction. We think she has been sleeping. Some peoples are too wakeful. They do not rest well. When they turn over in bed, the bed creaks, perhaps the windows rattle. When China turns over, the bed falls down, the house collapses, the foundations separate into their elements.

China has lived long enough to prove that there are more enduring things within a people than government. We of the West have not yet learned this. In some parts of the West we still think that government is a copartnership with God.

Eighth, China is described as the oldest great country of widely disseminated learning. This learning may not be universally acquired, but it is nevertheless accessible. Wherever I went, I was impressed with the number of books on sale. I do not know what was in these books, but I saw them.

(Query: Is universal popular education essential to permanent institutions?)

Ninth, China has had probably the most perfect educational system yet devised. We may not agree that the educational result has been most worth while, but it has led directly into civic office and has opened a career for talent.

In the former Chinese system, which came to an end practically with the fall of the Manchus, in very recent years, the wealthy youth even if from the city was not much favored over the poorer youth even if from the country. The clan or family supported the poor boy of promise for the sake of the clan: we support such a one for sweet charity, or the government extends its benevolence. There were no extensive and expensive laboratories and technical schools. The exercise was pure learn-

ing, such as should delight the heart of the purest classicist.

Modern education in the all-wise Occident is an urban enterprise. It is very expensive. Introduced into China it is likely unduly to favor the city youth.

(Query: Do our great compulso y systems of uniformity in education open a career for talent? In the old academy days, public opinion allowed one student to be treated differently from another: we still boast of the strong characters that came out of the academies.)

Tenth, China has now thrown off the alien Manchu dynasty, has washed her hands clean of it, and has set herself to the repairing of the experience of the last hundred years or so. I was in China in 1917 when the young Manchu prince was restored. Even in a time of internal dissension and of world disturbance, the youth was allowed in a few days to return to his pursuits. The old order is ended. China cannot live on her past. She knows it.

Eleventh, the Chinese have learned that some things lie beyond the inquisitiveness of man. They have accepted this fact. Confucius taught that some truths of nature are not discoverable. With all our inquiries we seem to be as far as ever from the ultimates. The Caucasian assumes that he can solve the riddle of the universe by rule and balance, by retort, by microscope and telescope. Yet the basis of any science is at first an assumption. Perhaps we shall some day conclude that the ultimate truths must be projected rather than discovered.

(Query: Have we yet learned how to use natural science? Is it to be used for power that we may accumulate to ourselves the physical and material goods of life? Are we not now at battle with this idea?)

Some day we shall learn that science is not merely a handmaiden to industry but that it may expand the soul.

I could much extend these interesting categories but I have given enough for my purpose, which is to suggest that China has much to teach us and that we should send our instructors in no spirit of superiority or complacency; and also that we are not to judge China by what we of the West are fond of calling "progress."

The objective civilization of the West has much to learn from the subjective experience of the East. China is indeed weak in the occidental commercial sense, and we assume that whatever is weak commercially is weak essentially. Here we make a profound mistake. We are even now at war with this idea. We have been dazzled by the efficiency of Germany as a highly organized state, incorporating the methods of business into its system. The western world has prided itself on the discovery of Efficiency. We have worshiped at the feet of the God of Efficiency. Now we find that it is only a species of idolatry and soon we shall be trying to smash the idol. We begin to see that we have been worshipping the Golden Calf.

I am not much given to the demand that we fill the great responsibilities with business men. We live in a commercial civilization, but not the programs nor even the methods of business are necessarily superlative. For public work we need much more than so-called business ability. We need broad views on public questions, outlook into future results, passion for public service. The activity of accumulation, which is the guiding principle in business, is not the best training for public service. I have noticed in good business men a singular lack of judgment on large public policies, and a short reach in dealing with many of the elementary principles controlling economic and social questions. I have come to feel that I want the outside view. The business man is trained in judging men and situations as they affect him. Personally he may

be wholly unselfish, but his habitual attitude is likely to unfit him for administrative duties affecting great complexities of interests. We make a major mistake when we assume that business men are by their experience better qualified than all others in executive ability. I resent the complacent assumption that "business" is naturally and as a matter of course superior.

Trade is indeed good for China, but it should be subordinate.

All this being my line of approach, you will understand that I have no remedies and certainly no panaceas for what we may call the deficiencies in China. The problem is China's. I cannot look on the missionary as her salvation, although I am sure he is making a vast contribution. So long as China does not interfere with the peace and prospects of other peoples, her problem is not the responsibility or even the business of any other people or country. It is not the civic responsibility of the missionaries except in so far as they may aid China toward a right solution. The reformation of China (if reformation is necessary) is not to be accomplished by the occidentalization of it, nor by the mere introduction of invention and the extension of commerce. The Caucasian is not called to monitor the world.

Commerce or trade is particularly disqualified for the service needed just now in China, and for the very good reason that it is not disinterested. Trade does not undertake fundamental solutions, but operates in the realm of expediences, combinations for control, gain for those persons who happen at the moment to be transient on the earth. The operations of the Powers in China have been largely on the commercial plane; the exhibition has not been altogether edifying and much of it will not receive the approval of coming generations. Yet, the way may have been opened for the release of China from herself.

Any foreign influence to be permanent and corrective must first of all regard the welfare of the Chinese, and very much as the best Chinese themselves measure that welfare. We have much to do to correct and to repudiate what has been done in China by the foreigner in the name of civilization. Even because a man is weak or lame is no reason why we should take his coat.

This outside influence must be sympathetic. It seems to be a common idea of the foreigner that he must carry his own institutions into China and plant them there rather than to develop the native institutions. This is well expressed in the architecture of the foreigners. There are many interesting lines and details of motif in Chinese architecture that can be carried over into modern construction; yet, with the exception of an occasional concession in roof lines, I saw little of the oriental in the foreign buildings, no sufficient suggestion of adaptation to the people among whom these foreigners live, nor invitation of kindly sympathy. Considering its place, some of the introduced architecture is repulsive.

We are in great haste to "open up" China. Yet I fail to see the need for haste. It might be a vast gain to humanity if most of the remaining resources of the planet were allowed to lie until we have learned how to utilize them righteously. What matters it if China were not "developed" for one hundred or even two hundred years? I doubt whether the Chinese are yet ready for this development; and for the rest of us, why not leave some of the opportunity for riches to our sons' sons?

Everyone asks me whether China will pull herself out of her difficulties. My greatest fear is that the Powers will not keep their hands off. She will right herself slowly. The process ought to be slow, in keeping with her history. Suppose it requires twenty-five or even fifty years to work out a government suited to the modern needs of China:

what is that as against her thousands of years? It is often said that an international commission should be constituted to govern China. I think an international commission is indeed needed: its function should be to devise ways and means to let China alone.

There are two quickening forces for China: Education, Religion. There are no others. If these forces join hands, regeneration will come irresistibly, if we are patient and if we leave the application to the Chinese.

I have seen something of the missionary work. I admire it and think its results have been remarkable, yet some of it does not strike bottom. You cannot Christianize the Chinese or any others independently of the everyday needs of the people. This the missionaries have learned: to their evangelization they have added schools, hospitals and medical services, industrial education. The strong medicine of evangelization must be accompanied by much economic, social, and civic sanitation.

It is estimated that eighty-five per cent of the population of China is agricultural. The missionary who can aid the people in their farming will have a double hold. Essentially the same need exists in every missionary country. The agricultural mission must be one of the strong movements of the coming years.

The fundamental situation in China today is not its government, its social institutions, or its commercial development, but its agriculture. Those millions of people must be clothed, fed and supported, and the scale of living must certainly rise. The spirit in which all this is accomplished will determine the spirit of the people and their civilization. China needs a vivid awakening in her agriculture. I should beware of any laid-down system of improvement. I should prefer to teach. I wish that some gifted far-seeing spirit, knowing

the rural background of the race and in touch with modern science and practice, could spend some years in China, unattached to any mission, unconnected with government, perhaps supported by an organization designed for the purpose, and that he would analyze the rural problem for the people, seeing it from the outside, and present it to them in a clear picture by tract and speech, to the end that they might plan ways to meet the situation, rising to it as they see it.

The Chinese are a people of broad moralities, much given to ethical admonition. They are guided by proverbs and sayings. Their philosophy is very different from that of the Occident, apparently lacking the Scriptural postulate of the fall of man. "The nature of man is good," saith the Teacher, and this statement is repeated in the schoolbooks. The admonitions develop this natural goodness. Lacking the effort to recover the original state of sinlessness, the elements of contrition and repentance, as understood in the West, seem to be absent, with the theological conceptions of atonement and redemption. This attitude largely explains much of the history of China, taken in connection with its ancestralism. China has been chained to its past, much dominated by its family histories.

The civic value of repentance and remission of sins lies in the fact that one regrets the past and desires a new future. It stimulates constant freedom from oneself. So the worship of a living God rather than the religious veneration of an ancestral tree looks forward and assimilates all that is new. It is the forward look, as I am impressed, that is needed in China, but I trust it may be the racial outlook of the Chinese rather than an imitation of the West.

Position of Science in the Present War¹

American inventiveness in science, which has given birth to the telegraph, the telephone, the phonograph, the rapid-firing gun, and the flying machine, put also the submarine into the hands of the enemy in the great World War, but this same American inventiveness will soon prove the submarine a most fragile weapon

By M. I. PUPIN

Professor of Electromechanics, Columbia University

IN a world crisis like the present war each human factor plays its true part. Virtue and merit shine with everlasting glory, sham and pretense are swept away like chaff before the wind. That which is strong stands and makes things move, that which is feeble falls and is buried in the dust.

No human endeavor during this world crisis has proved its virtue more splendidly than the efforts of the men of science. When the war started, British scientists rushed to the trenches of Flanders; all honor to their patriotic zeal! But before the war had progressed very far, England discovered that the true place for her scientists was not in the trenches of Flanders but in the research laboratories where they could apply their training and their skill in developing those scientific appliances without which no victory can be expected over an enemy who has for nearly fifty years been preparing for this war in the finest scientific laboratories of the world. The misapplication of science by a ruthless enemy forced England to start in the midst of this war a wise and efficient application of science. She recalled many of her scientists from the trenches of Flanders and started them to work in the laboratories of the United Kingdom. In this manner was born the Advisory Council for Scientific and Engineering Research in the United Kingdom. General Haig in one of his reports

speaks in the very highest terms of the great services which this scientific body contributed to the defense of Great Britain. England's preparation for this war consisted not only in drilling her armies and in reorganizing her industrial plants but also in organizing her scientific research facilities for the defense of everything for which England stands. The result has been magnificent.

What I have just said of England is equally true of France. The fate of France is just as much in the hands of her men of science as it is in the hands of her heroic soldiers, who kept the Teuton out of Paris and out of Verdun and are forcing him now to retreat from the sacred soil of France. Carnot, the greatest scientific genius of his time, was also a great power in the defense of his country when, a hundred years ago, France was attacked by the great League of Europe. Today Painlevé, the mathematician, is a distinguished member of the War Cabinet of France, and Painlevé is the general of the great French army of scientists who are making the attacks of the French arms so deadly to the enemy.

The scientific men of the United States are better organized today than they ever were before, because they feel that the country needs now the very best efforts of their service. About two years ago President Wilson appointed a National Advisory Committee on

¹ Presidential address before the New York Academy of Sciences.

Aëronautics, consisting of scientific men capable of advising the government on the development of the aëronautical art. The result has been most excellent, and a continuing three-year program has been evolved which will give within that interval of time to the United States as good an aërial service as there is anywhere in the world. A little more than a year ago Secretary Daniels appointed a Naval Advisory Board, consisting of splendid engineers and scientists, capable of advising our naval departments on every question that may arise in the course of our naval preparations. One of the great results of the work of this Naval Board is the splendid appropriation of several million dollars for the organization of a naval research laboratory. Every scientific problem which is before the Navy, as, for instance, the corrosion of guns, is referred to the Naval Advisory Board, and receives there the very best scientific consideration.

A year ago President Wilson, through the National Academy of Sciences, started the movement for mobilizing all the scientific research facilities of this country, and thus the National Research Council was born. In this National Research Council we have now a splendidly organized coöperative body of all men of science, embracing not only our universities and engineering schools, but also members of the various scientific bureaus in Washington, and our industrial organizations, and all the members of our national engineering and scientific societies. This coöperation is already bearing fruit. Scientific problems which are connected with the defense of the country have

been solved or are in rapid process of solution, as, for example, the production of optical glass, and the production of nitric acid.

One problem of the war deserves above all a special mention here. It is the submarine problem. The Germans have announced to the world that unrestricted submarine warfare is their trump card, and that they are staking their all upon this card. The result of this move of German ruthlessness has been most serious; it forced us into the war, and we have now to combat the very weapon which the inventive genius of this country produced. The submarine itself, as well as the instrumentalities employed in its operation, is the product of American inventiveness, the same inventiveness which gave birth to the telegraph, the telephone, the phonograph, the rapid-firing gun, and the flying machine. But the Germans ought to have known that the same inventive genius which gave them the submarine weapon will also knock it out of their hands.

The scientific men of this country command an art which has been developed here during the last five years by scientific research of the very highest order. Some of the very best scientific minds of America are confident that they will soon employ this art to convince the Germans that the submarine is the most fragile weapon which they are wielding, and if this weapon is really the last trump card upon which they have staked their all, then they have lost. Victory will be ours and the people of this country will recognize that after all Scientific Research is the most valuable asset which the country possesses.



Nesting Habits of the African Hornbill¹

By HERBERT LANG and JAMES P. CHAPIN

THE nest of a pair of African hornbills was discovered about fifteen miles southeast of Medje in the columnar trunk of a mambao (*Macrolobium Dewevrei*), one of the most stately trees of the Congo forests, by natives working for the American Museum's Congo Expedition. The tree measured 140 feet, almost the average height, and the entrance to the nest, a projecting knot-hole facing east, was seventy-one feet above the ground. Mambao trees occurred in great numbers in this locality, and as this particular tree had to be felled, we were forced to test the hardness of the reddish-brown wood, so highly valued for construction purposes

because it is not easily attacked by termites. The plaster of mud that nearly filled the opening of the nest was carefully removed by the man who took out the brooding bird. Then the Medje natives, according to their custom, installed their frail fifteen-foot scaffold for the woodcutters and finally, after four hours of strenuous effort during which the native axes had to be sharpened continually, the gigantic tree

crashed down. A five-foot section containing the nesting site was cut out and fortunately proved fairly hollow so that the work of splitting and sawing into porter's loads was considerably facilitated, yet fifteen

men were needed for the transportation of the different portions.

After two days of hard work, made particularly disagreeable by terrific rainstorms, an incident occurred which explained one of the reasons why the natives value the hornbill and its nest. The chief of the nearest village, about ten miles distant, paid us a visit, fearing that we intended to gather a medicine of remarkable potency from the nest, but, on seeing the porters

shouldering their burdens, "mere pieces of firewood," his countenance immediately brightened and with great delight he told us that such trees, not hollow, however, and of better wood, were growing right near his village. If we would give him plenty of cloth, copper, brass rings, beads, and salt, he would have as many cut as he had fingers on his hand, and his people would bring them to the post; not even the smallest branches



A frail scaffold of slender poles is bound together with lianas. Large trees are cut from fifteen to twenty feet above the ground to avoid the broad buttresses. The huge weathered columns left standing contrast strangely and picturesquely with the tiny native huts below—especially in moonlight

¹ There is now installed on the second floor of the American Museum, a group of African hornbills and their nest, the materials for the group having been collected during the Congo Expedition of 1909-1915.



COLLECTING THE HORNBILL'S NEST FOR EXHIBITION IN THE AMERICAN MUSEUM

The hornbill's nest was located within the hollow tree, back of the knot-hole, about seventy feet from the ground. With the small primitive axe, the Medje woodcutters felled the tree after four hours of strenuous effort. The section, by which they are standing, was three feet in diameter. The axes are a common product of ironworkers in the northeastern Congo and are acceptable as currency equal to from ten to twenty cents in American money. Each is carefully fitted into a hole burnt through the wider part of a handle made from a tough knot. (While the tree was being sawed and split into porters' loads, the natives inquired whether all hornbills' nests, like rubber, would in future be packed in baskets and shipped to Europe)



LARGEST OF THE AFRICAN HORNBILLS

(Photographs about one half natural size)

These photographs, male (right) and female (left), of the tree hornbill (*Ceratopinnia atrata* Tem.) are from mounted specimens in the American Museum group. The dusky big bill with its formidable looking casque, although probably ornamental, is without the glaring red and yellow of the toucans (corresponding species in the South American forests). The wattles and naked parts around the orbits, however, are often bright blue and red. It has been suggested that the hollow casques are reverberating organs, but equally loud calls are possessed by the female, always with smaller casque, and also by species in which the casque is absent. As a weapon, the beak is used only for snapping, as it lacks the forceful thrust which would be given by a long neck like the heron's. The serrated edges are helpful in peeling pulp from the hard seeds of tropical fruits, the main food of hornbills, although an occasional insect or small mammal is taken

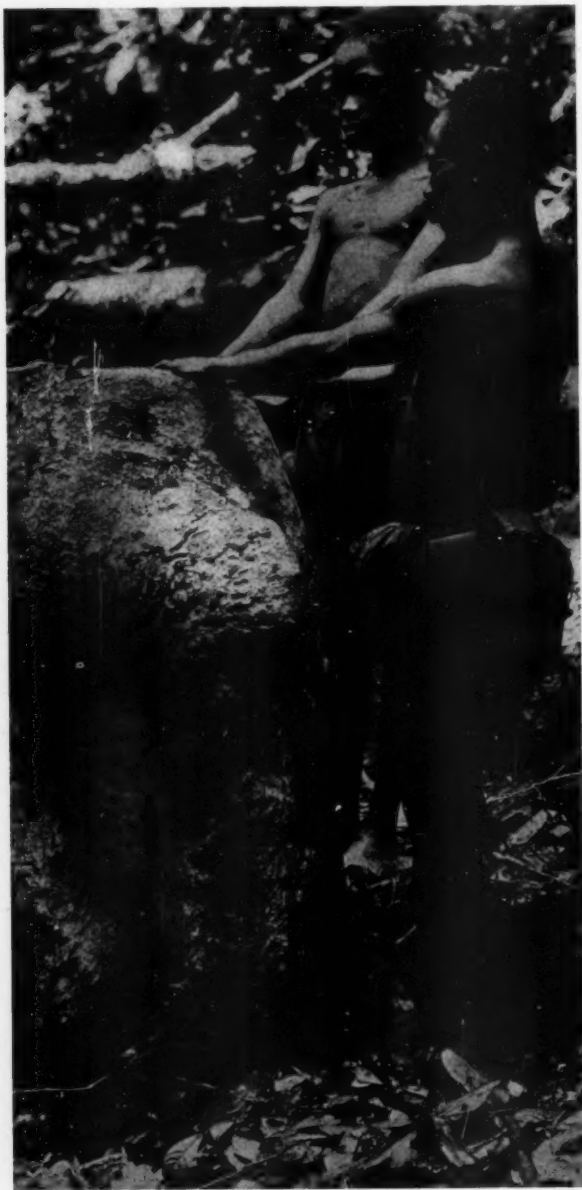
would be left in the forest. The white man would never need to come into the wilderness.

On the floor of the nest were the

hard, black seeds of a large tree (*Riciodendron Heudeloti* Baillon), in such quantities that they helped to raise the

level of the moist bottom. They had passed through the birds' digestive tract without any apparent change, but when opened they distinctly showed that the oil they contained had been extracted. Three of these seeds are enclosed in a capsule which, when ripe, drops off and automatically opens, scattering the seeds on the ground, where the hornbills are forced to collect them. This is a really perilous feat for the birds because they gather around the spot in such numbers and with such loud cries that the natives, informed of their whereabouts, find it a simple matter to entrap them in carefully set snares.

There are 70 species of hornbills (Bucerotidæ), 40 of them being found in tropical Asia and the East Indies, while the other 30 are found only in Africa. The birds in the group, *Ceratogymna atrata* Tem., belong to the largest species among the hornbills of the West African rain forests. One usually sees the birds in pairs, most frequently in the highest tree tops, rather avoiding the neighborhood of villages. Half a dozen or more may gather near certain fruit-bearing trees, making their presence known by the mournful, oft-repeated "whao . . . , whao . . . " for which the Mangbetu imitatively calls



The male hornbill seals the knot-hole leading to the nest with a plaster of mud, except for a small opening (visible at the lower left corner). The female and young are imprisoned within, and are fed by the male through the small opening. Thus, in the free-standing columnar tree a stronghold is secured for the breeding female and defenseless young, to which nest-pilfering monkeys, birds of prey, and even snakes can hardly gain access

them "Napwungu." Sometimes this call is uttered during the long, deep undulations of their characteristic flight and can be heard at the distance of half a mile. A sure indication of their proximity is the peculiar swishing sound made by them as they pass from tree to tree.

The breeding habits of hornbills have attracted much attention and are certainly remarkable, for the male, to all appearances, seals the hen peremptorily in a hollow tree, thus forcing her into an imprisonment often lasting two months or until the young bird is full-fledged. As a matter of fact, however, the parent birds act in perfect harmony, their actions being governed, apparently, by the concerted idea of shutting out all troubling influences that might interfere with the successful raising of their offspring which is born in a particularly helpless condition, without down, and remains blind until after the feathers begin to appear. Though the knot-hole selected leads into a cavity hardly large enough to hold the mother and the young bird, they are less inconvenienced than one would suppose, for there is a peculiar, hinged joint at the root of the tail so that its long feathers can easily be folded over the back, thus enabling the bird to be comfortable in a smaller space than otherwise would be possible. The ground hornbill (*Bucorvus*), said to build an open nest, is



Young hornbills are most helpless at birth. Their eyes remain closed even after the feathers begin to appear, as shown in this two-weeks-old bird. So well does the male feed both female and young that their plump condition is proverbial among natives, who are sure to find fat morsels when looting a nest



This young female hornbill was reared in the tree now on exhibition at the American Museum. The tail folds forward against the back and thus the feathers are never damaged by the crowded condition of the nest. The young usually sit on their heels, which have no spinelike excrescences such as those found in toucans, woodpeckers, and barbets. The bill is rather soft and delicate, and the casque does not appear until later

probably the only exception among the hornbills to this general practice of nesting in hollow trees.

The entrance to the nest is usually situated from 60 to 120 feet above the ground, either in the main stem or on the lower side of a branch, away from

neighboring boughs or vines. Nest-pilfering monkeys, genets, or even snakes would have difficulty in securing a hold upon the surrounding smooth bark. The male hornbill, when feeding his charges, clings to the tree much as woodpeckers do, using his tail as a support.

In the big tree-hornbills, such as *Ceratogymna*, the female, after courtship, enters the nest without collecting any nest-building material and lays one pure white egg directly upon the detritus of decayed wood. The male then undertakes the task of gathering soft earth from the edge of one of the numerous brooks, and, from a distance of several hundred yards, carries it in his bill to the nest. The beak hardly seems a suitable instrument for cementing this mixture of coarse sand and clay, yet both parents use it with admirable success until the big hole is narrowed to a mere fissure (about one inch in width) sufficiently large to allow the insertion of food for the female and young. The mixture, perhaps rendered more plastic by the addition of saliva, becomes very hard and, in spite of a thickness of several inches, no cracks are noticeable and perfect adhesion to the bark is secured. The female hornbill is evidently a willing prisoner as she increases the thickness of the plaster considerably by adding to the inside excrement containing chitinous particles of insects and seeds of forest trees. Females of smaller species (*Lophoceros* and *Ortholophus*) which lay two or possibly three eggs, do not give up their liberty until courtship is ended and both or all three eggs have been laid.

Contrary to what has been stated of hornbills in general, the female of *Ceratogymna* does not emerge from confinement with a complete new set of feathers. Only a few of the larger quills are shed inside the nest, and from our subsequent experience we found that the process of molting is not al-

ways completed during the breeding period. Gradual molting of adults and young may occur throughout the year, and the nesting season does not seem to be restricted to any particular time, for only near the southern and northern borders of the West African rain forest are seasons well defined.

The plump condition of the young, and sometimes even of the female, proves how great is the devotion of the spouse, for hornbills as a rule are lean. So zealous is this self-appointed purveyor in the task of bringing food to his charges that his continuous flights, increasing with the growth of the young, often invite destruction, for, to the watchful native, they are the welcome signal for looting the nest. It is not only the hope of the roasted bodies that furnishes the incentive, but superstition puts a high price on the possession of the bills of breeding hornbills, so that the native seldom hesitates to spend a day or two in climbing these enormous trees, and he sometimes succeeds in trapping the male birds as well as capturing the females.

When taken from their nests, hornbills bite savagely, but once tucked into a basket, they hardly defend themselves. The big bill,¹ with the formidable looking casque of the male, consisting mainly of thin-walled cellular tissue, is weak except for the sharp tip and the serrated edges. Indeed, it is chiefly ornamental for, in encounters, this weapon is good only for snapping, as it lacks the forceful thrust of a long neck as in the heron. The birds are neither bold nor aggressive in temper as their feeding habits prove, for vegetable food forms their main sustenance. We have found in their stomachs the fruits of eight different kinds of forest trees, together with the oily pulp of palm

¹ There is a curious analogy between the hornbills of the Old World and the toucans of the New: both have big bills, both nest in hollow trees, in both groups the young are born helpless and naked, and in both the tail can be folded upon the back.

nuts, which are often swallowed with their seeds. A great variety of hard-shelled insects are sometimes taken in flight, and some caterpillars which occur on the leaves in great numbers are eagerly sought. Land crabs are taken occasionally, and in rare cases, as other species proved, a lizard or a shrew completes their diet.

To the African native, birds and beasts are invested with properties widely different from those known to science, but quite as interesting. Those attributed to the hornbills are as fantastic as the appearance of the bird itself. The Medje, Mangbetu, and Azande firmly believe that a man who wears on his neck the beak of a breeding hornbill can be sure of the affection of his wife, and the younger, newly-married men especially seem to be desirous of pinning love to their hearts in this fashion. Again, the huge beaks of nearly all species of hornbills are fastened to the waists of tiny children as a cure for malnutrition, for the mothers of these youngsters know that young hornbills are well fed, and so they hope to secure a charm which will fatten their own emaciated little ones. Often, however, a less kindly quality enters into the superstition, and the bird is even supposed to aid in gaining revenge of a certain kind. A disillusioned Azande husband may roam the forest in search of a hornbill's nest merely to collect some of the pellets of excrement, for if he throws the dirt actually taken from the hornbill's secure home, at his unruly wife, she will wander forever without finding another husband, a great disgrace in a land

where the unmarried woman is considered an outcast.

Hornbills have even been made the totem of the Wabali tribe living along the Ituri and Aruwimi rivers. They hold the large black-and-white species, *Bycanistes albotibialis*, in greater reverence than their own people, for as cannibals they might not spare relatives, but no one would dare eat this or any other hornbill.

Wabali men are proud of their tribal marks, a series of crescent-shaped scars on breast and abdomen, readily distinguishing them from their neighbors, a vital factor in the thick of battle or other encounter when they fight for each other or die. No coward can be so marked, for as mere boys they must prove in public that they can suffer great pain with a smile.

The famous ceremony of initiation includes a terrible thrashing from the elders, who flog them with long switches until tired. Woe to him who murmurs or cries out,—he can never be bitten by the incensed mother hornbill kept ready to acknowledge his unwavering courage. As a matter of fact the hen hornbill is only an accessory satisfying their superstition, for the wounds are cut by medicine men when the boys are blindfolded. Those who withstand the ordeal wear curious collars of a fibrous, brown material, later thrown into the big, unchanging river, but in the meantime supposedly protecting them from sickness until the sores have healed; and these scars make them men in the eyes of all. Forever thereafter a Wabali is considered brave, striving to raise and protect his offspring as successfully as the hornbill.



PRAIRIE CHICKENS ON THE GRASSY PLAINS OF NEBRASKA

During the mating season prairie chickens gather in the early mornings on certain open fields which have served them as dance areas for many generations. The resemblance of this prairie chicken to the heath hen in appearance and in the habits of the mating season is at once apparent. In fact, not until 1885 was it discovered that the birds of Martha's Vineyard were distinct from the prairie chicken. The species had then been killed out on the mainland and it was too late to determine how far west it had ranged, but it is known to have been abundant in the country east of the Appalachians and south to Pennsylvania. The photograph above is made from the habitat group in the American Museum, constructed in 1906 under the direction of Dr. Frank M. Chapman



Martha's Vineyard, the last refuge of the heath hen.—The immediate scene is the nesting site studied for reproduction, with nest and birds, in the American Museum. (See detail on page 280)

The Heath Hen of Martha's Vineyard¹

By EDWARD HOWE FORBUSH

State Ornithologist of Massachusetts

A WIDE plain covered with diminutive leafless shrubby oaks and low bushes, with stunted pines showing here and there; to the west low rolling hills; to the south on the far horizon the wide Atlantic; such is the prospect on an April morning from the fire tower on the plains of Martha's Vineyard where the few remaining heath hens now make their last stand. Here in the gray dawn a strange, weird sound fills the air. It swells and dies upon the ear, but never rises or falls, and becomes intermittent or ceases only when the sun rides up the sky. Apparently it is not a vocal effort. It is neither whistle nor call; there is no other sound quite like it in nature. One might imagine it the wail of the wind spirit, but no man understands just what it is or how it is made. We know only that it emanates from strutting, dancing heath cocks, and is one of their customary mating sounds. Heard from a distance, borne on the sea wind, it swells to the fullness of a grand undertone, mingling with the ordinary nearer sounds of the rolling plain. Like the trilling of the toads in a million pools, like the morning chorus of bird song on a thousand hills, it is a vital, virile expression of the fecundity

of old Mother Earth. It is a rune of reproduction, foretelling the renewal and multiplication of the species in the coming spring awakening. It is a paean of hope and joy, a forerunner of the pulsating, vigorous life of summer.

No satisfactory explanation has been advanced regarding the means by which this sound is produced. As we listen to its volume the wonder grows; fifty birds seem to make noise enough for a thousand, and this they do apparently without opening their mouths or using their vocal organs. The sound may be heard under favorable conditions for about two miles. Some future investigator may solve the riddle of its production.

The heath hen is the eastern form of the prairie chicken. It is smaller and ruddier or rustier above than its western congener and much less white below; its tarsi are both relatively and actually shorter; the rigid feathers of the neck tufts are more acutely pointed and fewer in number. Formerly the heath hen was abundant in suitable localities in New England and the Middle States east of the Appalachian Mountains and south to Pennsylvania. It may have extended farther west,

¹ With illustrations from photographs from life by Dr. George W. Field.

even to Kentucky, but as it was not distinguished from the prairie chicken



The nest of the heath hen, merely a slight hollow scratched in the ground, is likely to be under low shrubby oaks or pines. When the young are hatched they are ready to follow the mother within a few hours. (Photographed from group in the American Museum)

until 1885,¹ when it had been extirpated from the mainland and was confined to the island of Martha's Vineyard, Massachusetts, no one knows where its range ended and that of the prairie chicken began.

Its extirpation on the mainland was due mainly to lack of statutory protection and law enforcement. Its preservation on Martha's Vineyard may be attributed partly to local pride in the species as a distinctive bird of the island, and in part to the efforts of the Massachusetts Commission on Fisheries and Game, under whose authority a reservation for the protection of the species has been maintained since 1907, where shooting is prohibited at all times. Since the establishment of the reservation the birds have increased greatly from time to time, but they have been decimated by forest fires. On May 2, 1907, following a severe fire in 1906, the Commissioners could find only twenty-one birds. On January 11, 1908, the number in existence was believed to be between forty-five and sixty. In a careful inspection of the region in 1916, I accounted for fully eight hundred birds, and the superintendent then in charge believed that there were about two thousand. Shortly afterward a raging fire swept the reservation. This was followed during the ensuing winter by a flight of goshawks which are very destructive to grouse, and in April, 1917, I could not account for more than one hundred and twenty-six, a large proportion of which were males. It is probable that fewer than fifty females survived the winter. A few birds meantime had been sent to Long Island, New York, and to Essex County, Massachusetts, in the hope of establishing new colonies, but those on Long Island did not survive. Such in brief is the history of the heath hen.

The most remarkable and interesting

¹ Brewster, William, *Auk*, Vol. II, Jan., 1885, p. 80.



Courtesy Massachusetts Commissioners
on Fisheries and Game

The heath hen (*Tympanuchus cupido*) is very similar to the prairie chicken (*Tympanuchus americanus*) but smaller and darker in color. The neck tufts are composed of acutely lance-pointed feathers

habits of this bird are those of the mating season. These are not unique, as other American grouse give more or less similar manifestations of the mating instinct, but they are worth going far to see. My opportunities for watching their mating antics have been all that could be desired. Some of my observations have been made from a blind raised about two feet above the surface of the ground so that the birds could pass not only all about but underneath, and they not infrequently alighted on top of the blind, thus affording chances to view them from all directions.

The male birds begin to "toot" and strut about four o'clock, or even earlier on bright mornings. Many gather on certain open fields or cleared spots that have served as their assembling places for many years, and there the dance goes on apace until about seven o'clock, when it begins to subside and the birds scatter. The "toot-

ing" however may be heard at intervals during the day. Again toward sundown there is another gathering that lasts until the dusk of evening. My observations, therefore, have been made early in the morning, or toward sunset, and were possible only through the courtesy of the Massachusetts Commissioners on Fisheries and Game and their superintendent on the reservation, Mr. William Day.

In April, 1917, I went to the reserve in company with Mr.

A. C. Bent. On April 25, at three in the afternoon, I entered a "blind" in a cornfield where the birds were accustomed to dance and where corn had been thrown out to attract them. The standing corn had been cut and removed, providing an



While the male is dancing the plumage is fluffed, the tail erect, and the drooping wings almost touch the ground



Courtesy Massachusetts Commissioners on Fisheries and Game

The Dance.—His beauties displayed, the heath cock is a handsome fellow—if somewhat bizarre and unbirdlike. The neck tufts may be erected and thrown forward over the head with the points together like an inverted V

unobstructed view. At first no heath hens appeared. Red-winged blackbirds came and alighted on the blind, then descended and fed on the corn. A robin came, and it was interesting to listen to the timbre of its well-known notes at a distance of less than three feet. At 4:40 the first heath hen appeared, and soon the show began, but no bird came very near the blind until about five o'clock. Then for an hour the dance went on all about me until the superintendent appeared. This was the signal for the end of the performance. The day was clear, the light excellent, and all conditions for observation were of the best. Only four females came within my range of vision, but from twenty to twenty-five males were in sight constantly. Occasionally a female picked up a little corn, but the males did not feed. They seemed to be obsessed with their own antics and devoted themselves with great enthusiasm to the dance. This exercise consists of running, strutting, bowing, posturing, cackling, calling, flapping up and turning about in the air, and even fighting a little from time to time. All in all it is a great

and exciting expression of the abounding energy of the species. While the male is dancing the body is inclined forward, the neck stretched out horizontally with the bill pointed downward, the plumage is fluffed, the tail erected and spread more or less, the wings drooping or partly spread downward but the lowest of the separated primary quills rarely reaches the ground. The pinnates, or "neck tufts," are erected like rabbit's ears, or thrown away forward, over and in front of the lowered head, with the points together like an inverted V. In this position the bird inflates the orange air sacs on the sides of the neck, which sometimes show pinkish or flesh color around the edges, or even purplish at the upper edge, but look much like small oranges and are about the size of a tennis ball. In some cases they appear more triangular than round, but usually they seem globular when seen in profile, and project considerably on either side of the neck. The yellow combs over the eyes are enlarged also at the same time and become turgid, while the bird seems to increase in size. The white tips of the tail coverts show like the



Courtesy of A. C. Bent

On the Run.—In the dance he runs and postures, rises and turns about in the air, and even fights a little from time to time. The neck tufts are thrust forward like a rabbit's ears, and the air sacs are inflated until they resemble small oranges

"white flag" of a deer. With all his beauties thus displayed the heath cock is a handsome fellow, but seems bizarre and unbirdlike to human eyes.

The booming or "tooting" sound is produced, not when the air is expelled from the sacs, but while they are swelling, and stops then until they have been more or less deflated. It is not so deep and resonant as is that produced by the prairie chicken, and never resembles "the distant croaking of bullfrogs or the grunting of buffaloes;" resemblances which Nuttall ascribes to the booming of the prairie chicken. It may be likened to the sougling of the wind, or the noise produced by blowing gently into a small bottle or phial, but is more musical. It is commonly a double *woo'-doo*, or at times a triple *oo-oo'-woo*, with the accent on the second syllable and all on the same pitch. There is no perceptible final falling inflection, but it ends in the air like a Scotch ballad. Rarely the last note comes on a lower pitch than the others, and a few birds sound a deeper tone all through it, but most of them maintain the same pitch, and when forty or fifty are engaged in the dance a great vol-

ume of sound is produced lasting almost continuously for two hours or more. It has something of the quality of the subdued and distant echo of many medium pitched steam whistles. Above this can be heard a medley of vocal notes, some like the squeal of a frightened rabbit, some regular war whoops, such as *woowow* or *waugh*, others flatter, snarling calls given when two males are facing each other. There are many cackling and laughing sounds, some resembling those emitted by gulls, others those given by barnyard fowls. There are queer clucking and chuckling noises. The conversational character of some of these sounds recalls similar notes heard in more subdued tones from a flock of bobwhites. There are others resembling the whine of a puppy and one of the calls of a jay. Cooing also is heard, but no billing is seen. When close at hand the cries are more striking than the continued chorus of the "tooting," but at a distance of a mile or more, where the booming was plainly audible, only one of the louder vocal calls could be heard.

The males danced much of the time while producing these sounds. The

dance reminds one of similar performances by Indians. The bird bows or leans forward with muscles tense and rigid, lifting the feet stiffly but quickly and striking them down hard and very fast upon the ground, so that the sound may be heard for rods. Sometimes he stands in his place while dancing or merely wheels a little to right or left. Again he runs forward five or ten feet, or makes short rushes around the female in segments equaling about one third of a circle, sometimes circling her in three or four runs, but never seeming to approach very near her. I have never seen one caress or molest a female during these mating antics. How the happy pair perform when finally mated no one seems to know. The dancing is accelerated at the end until it somewhat resembles the quick tapping of a muffled drum, ending in a roll. This rapid stamping causes the whole body and especially the wings to quiver in unison with the drumming feet. The roll of the drumming can be heard continuously as it mingles with other sounds of the dance, but two hundred yards away it is inaudible. While dancing the male keeps the sacs and the combs over his eyes more or less distended, but in the "tooting" which usually precedes or follows the dance the sacs are fully inflated. They swell with each toot or syllable and contract more or less between each. I watched four birds perform thus at distances varying from five to eight feet. Audubon, experimenting with the prairie chicken, found that the bird could not produce the sound if the sacs were punctured. Evidently it is emitted in some way during the intake of the air.

Sometimes a male seems to challenge all creation by flying up a few feet, cackling meanwhile, and turning to different points of the compass so that upon alighting he faces in another direction from that in which he started. Two males sometimes, after posturing,

dancing, and blowing on the way, charge toward each other for many rods as if urged by the frenzy of battle, and then squat on the ground facing each other, open their beaks, and utter a variety of cries, as if trying to intimidate each other or to muster up sufficient courage to fight. Sometimes one turns and runs away, or backs off, or they may fly at each other like domestic cocks, or one may leap over his opponent, or they may even flutter up a few feet in actual combat, but I never saw blood spilled in any of these contests. Often they strut, dance, and toot without even offering to fight. Withal there is great excitement, constant sound and motion, each bird acting "as the spirit moves," and performing his part with ludicrous seriousness and self-importance. In the midst of all this commotion the females move about, calm and cool, apparently interested only in looking for something good to eat. Indeed they seem so unconcerned and indolent as to squat or lie down to eat corn rather than take the trouble to reach down and pick it up.

As night comes on the birds become more quiet and gradually steal away into the shades. It is remarkable how quickly and silently they can disappear in case of an alarm. They can hide in stubble where it would seem difficult to conceal a mouse, but if flushed they fly swiftly, fluttering and sailing much after the manner of a meadow lark. In this way they can quickly cover a mile. A flock of fifty birds thus speeding across country is an inspiring sight.

The nest of the heath hen is made on the ground, sometimes at the base of a stump, often among sprouts or bushes. From six to twelve or thirteen eggs are laid, buff in color and unmarked. When the downy young are hatched they are ready to follow the mother within a few hours, and she broods them under her wings wherever night overtakes her. They frequent dry and sandy plains and never have been seen

to go to the water to drink or bathe. Probably they get what moisture they need from their food or from the dew or rain, but captive birds have been known to take water supplied to them. During the hotter part of the day they seek dusting places in the dry sand along the roads, where they wallow and work the dust into their plumage. They feed upon green vegetation, such as grass, buds, clover and alfalfa, also on berries, acorns, grain, weed seeds and insects. They seem to roost on the ground or in low shrubbery, but sometimes alight on trees, fences, and buildings.

There are several historical legends regarding the heath hen that have been passed along down the years and may have some foundation in fact. Apparently it was a common bird in early colonial times on the sites of some of the largest cities of the Atlantic seaboard. DeVries and Megapolensis speak of it as common where New York City and Albany now stand. Nuttall,¹ writing of the bird in 1832, asserts that according to Governor Winthrop the species was once so common on the "ancient bushy site of Boston, that laboring people or servants stipulated with their employers not to have the *heath hen* brought to table oftener than a few times in the week!"

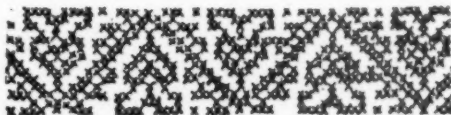
In 1834, when the legislature of Massachusetts enacted a law for the protection of this fowl, it is said that the printer made a slight typographical

error and that the document as printed appeared on the desks of the astonished members with the following title: "A Bill for the Protection of the Heathen of Martha's Vineyard."

In its final refuge the heath hen has the advantage of thick shrubby cover and few enemies. The chief of these, the domestic cat and certain hawks, are kept down to some extent by the guardians of the reservation. There are now few if any foxes, skunks, or raccoons on the Vineyard, and minks are rare. Therefore the species has a better chance to increase on the island than on any area of similar size on the mainland. If it becomes numerous there again in the near future, there is a region on Cape Cod similar in soil and vegetation to the plains of Martha's Vineyard, where surplus birds may be introduced and protected until the species again becomes established in its original habitat.

The future of the heath hen depends upon the treatment accorded it by the people of Massachusetts. If the game officials of the commonwealth are worthy of the trust reposed in them, if the people can be taught to refrain from slaughtering these birds, this remarkable species may be reintroduced into many of its old haunts in the New England and the Middle States. Otherwise, it will not be long ere the last individual of a vanishing race will see its last day fade and die over the hills of its island home, and another species will have joined the long list of those that are no more.

¹ Nuttall, Thomas, *Manual of the Ornithology of the United States and of Canada*. The Land Birds, 1832, p. 662.



Museum Documents and Modern Costume¹

By M. D. C. CRAWFORD

WITH AN INTRODUCTION BY CLARK WISSLER

Art museums are places where the various art products of the historic nations are preserved for the inspiration and instruction of our artists. But the nonhistoric peoples of the world also produced art objects which are exhibited in the anthropological collections of museums dealing with the natural history of man. The primary object in preserving these examples of primitive art is to instruct us as to the older forms of man's culture traits. We know that the facts of primitive culture are worth while because they inspire and broaden our outlook upon life. But primitive art is nevertheless art and often extremely good art. The readers of this JOURNAL are aware that textile artists have but recently discovered these primitive art collections and drawn from them the greatest inspiration. What they found was a great wealth of originality. Yet textile art is seldom a thing of itself, usually being a mere phase of personal adornment, as costuming. We often think of primitive folk as the unclothed, but that is a matter of definition. The facts are that they give a great deal of attention to costume and body ornamentation, and wherever textile arts flourish these are employed for the embellishment of costume. The American Museum collections contain many examples of primitive costume designing that have artistic merit. Their strong point is their originality. Hence, it is not strange that the costume designers of our day find these collections an unfailing source of inspiration. All this suggests the great potential value of a systematic museum collection of primitive arts and the justification of the space and energy that have been given to such exhibitions. But, in particular, this article upon costume designing in the Museum indicates how the movement for a new American textile and costume art has progressed, a movement which originated in New York City and which centers around the American Museum.—CLARK WISSLER.

IN ONE sense, this is frankly a fashion article. It deals with practical, modern costumes that have been passed upon, executed, and placed on the market by experts. It shows not only some work of young artists, but expresses as well the ripened judgment of professional designers and buyers. For the sake of comparison, the illustrations include a wide range of costume types, and the specialists who have contributed are among the leaders in their profession. In examining the illustrations, it must be remembered that this article deals neither with a theory nor with a promise of the future, but with an accomplished commercial fact. It is intended as a

practical demonstration of a very important development in the costume industry in America.

Above and beyond the artistic merit of these costumes, however, they illustrate in a definite manner a very important feature of the educational possibilities and public usefulness of the American Museum. Every single garment in the collection was founded on a specimen in the collections of this Museum. In certain instances, the inspiration is perhaps difficult to trace, but in others it is quite obvious. These garments represent the first fruits of what I may term "creative research" by the American costume industry. The documents in the Museum were studied

¹ The sketches which accompany this article were made by Harriet Meserole, Ruth Reeves Olds, and Sylverna Prior and are among the results of a campaign for the improvement of commercial design both in fabrics and costumes in America conducted by *Women's Wear* during the last three years. In my position as design editor of this publication, I have found of inestimable value the documents in the collections of the American Museum and in its library. The actual work in the Museum with individuals and in talks to groups of artists has been supplemented by the publication of designs and articles in *Women's Wear*, and I take this occasion to say that the debt the American costume and fabric industries owe to the American Museum of Natural History is immense.—THE AUTHOR.



EXAMPLE OF MODERN DESIGN FROM MUSEUM DOCUMENT

A house coat of silk duvetyn, decorated with hand embroidery and trimmed with fur. This costume was designed by Miss Jesse Franklin Turner, of Bonwit Teller & Co., from a Koryak fur coat in the collection of the American Museum of Natural History.

The color plate was donated by Bonwit Teller & Co.

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DESIGNS SUGGESTED BY INDIAN DOCUMENTS

At the left, a dinner gown, or negligee, embroidered in wool. The method of connecting the ends of the belt was suggested by girdles from the Goajiro Indians, in the Museum's collections from northern Colombia, and the decoration was inspired by a study of North American Indian collections. *Courtesy of Bonwit Teller & Co.*

At the right, a black satin evening gown with silken and bead tassels. The idea of the tassels owes its origin to the buckskin thongs that hang from a Dakota Indian costume. *Courtesy of Edward L. Mayer.*



In a gown of her own designing.—A class of advanced students in Teachers College, Columbia University, under Miss Ruth Wilmot, instructor of costume design, has created many modern garments along lines of form and decoration suggested by a study of specimens in the American Museum. The success of Miss Wilmot's work is attested by the fact that most of these garments have found ready sale among professional designers

with the view of applying ideas, either in decoration or in line, to modern costumes. Instead of the usual method of importing modern foreign costumes (themselves based, generally, on foreign museum collections), our designers, familiar with the practical needs of today, have gone direct to original

documents for their inspiration. The work, therefore, marks one of the most important movements in the development of a truly American type of industrial art.

Last year I described in the *JOURNAL* a similar development among the fabric designers in this city. It may not be out of place to note that this work has continued steadily, that the results have been not only artistically but also commercially successful. Many of the most interesting designs in printed silks and cottons now on the market owe their origin to some specimen in the American Museum. Not a day passes but I see some textile design either worn in a garment or on display in a shop window that owes its origin to museum inspiration. Thus the Museum has been responsible not only for commercial prosperity but also, by the character of the designs, for an improvement in national taste.

In spite of the importance justly attached to fabric decoration, costume designing is of more vital moment. The problems of the costume artist comprehend not only surface decoration, but color combinations, use of ornament, the general outline or silhouette, and a knowledge of the mass psychology of woman. The perfect artist in dress must have not only some of the feeling of the painter, but also of the sculptor, and added to this rare combination, a vision sufficient to judge the general feeling of women at least six months in advance.

One lesson we have learned from the war is the necessity for coöperation. The development of our natural resources, the proper expression of our national life, rest upon the perfect coöperation and coördination of our physical and intellectual powers. The basis of modern life is a perfectly regulated industrial system. If we are to endure as a great power, if we are to hold and advance our place among the great democracies, we must employ not only the skill and

vision of the scientist, but the knowledge of the scholar also and the feeling of the artist as well. But it is not efficiency alone that we need: we must bring back to modern industry as far as possible the personal interest that was in the ancient hand crafts. We must incorporate in our industrial art the charm and enthusiasm of other days.

It is not difficult to understand how important a part our great museums and libraries must play in the proper industrial expression of art. They are for the artist inexhaustible mines of suggestion. The art of each people and age is an evolution from some former type. The artist, especially the decorative artist, is concerned not alone with purely original creation, but with the inspired selection of certain ideas and motives of ancient origin that may have a fresh significance for his own time and people. The scientist and the scholar study the past, reject what is of no avail or is false, and build upon the refined residue our modern science and literature. Elimination and acceptance are of equal importance. So must the artist sift the artistic heritage of the past and salvage what is beautiful and appropriate for his own time.

The spirit that has guided America in this titanic struggle for democracy has enriched beyond estimate or appraisal our spiritual lives. The burdens and sacrifices that we have borne with pride and willingness, the splendid ideals for which we strive, have added a dignity and a feeling to our national life that must find expression in every phase of our physical and intellectual existence. We may confidently expect that the great industrial changes going on about us will be accompanied by a revival in art and literature.

Women's costumes are the first objects to feel the effect of this new

spirit. They reflect in simplicity and subdued ornament the reaction of our womanhood to the grave responsibilities and problems of the hour. The superficial and the ostentatious have been almost eliminated, and yet all the appeal and charm of brighter days retained and enhanced. The common sense and finer feelings of American women have resisted every effort to put them into drab uniforms. Had it been otherwise, we should have lost a wonderful charm from our lives. Whatever our subsequent experience, almost our first impression of color comes to us through costumes. And there are great numbers of people whose only art education is derived from fabrics and dress. If we exhibit in our museums the textiles and the garments of former ages, if we properly regard them as objects of art worthy of comparison with the canvases and marbles of the masters, we must admit that modern fabrics and costumes (if they are up to the proper standard) are worthy of consideration with contemporaneous art productions. In every age that expressed an art



The yoke and the knotted ribbons on the right side of this white silk tailor-made blouse were taken from a Korean blouse in the Museum's collections. Courtesy of Edward L. Mayer

worthy of the name, its influence was felt in even the most commonplace object. The real masters of form and color drew no snobbish divisional line between the so-called "fine" and "applied" arts. The definition of the word "artist" should be: "an individual by whose mind and hands beauty is imparted to any object." The method of execution, the mediums of expression, are of minor importance. If we consider a Peruvian poncho, a Sioux war shirt, or a Soudanese burnous as works of art, it is but fair to give to the product of our costume artists of today (when it merits the distinction) the same consideration. Antiquity, no doubt, has a charm and an interest apart from any other attribute, but it should not be the sole factor that determines the merit of artistic expression.

The costumes shown in this article are the work of five individuals,—Miss Ruth Wilmot, instructor of costume design in Teachers College, Columbia University; Miss Mary Walls, of John Wanamaker's; Miss Jesse Franklin Turner, of Bonwit Teller & Co.; Mr. Max Meyer, of A. Beller & Co.; and Mr. Edward L. Mayer.

Last fall Miss Wilmot brought a small group of advanced pupils to the American Museum to study certain primitive costumes. As a part of their regular class work they created from these suggestions modern garments. When the garments were ready, Miss Wilmot asked me to show them for criticism to a professional jury. Miss Turner, Miss Walls, and Mr. Edward L. Mayer were good enough to come to the Museum one evening and offer suggestions on the work submitted. It is surely a splendid endorsement of Miss Wilmot's effort that Miss Walls and Miss Turner bought from her class virtually all the garments shown. It also proves to students of costume design the practical value of museum research.

Miss Mary Walls, of John Wana-

maker's, has long been interested in the development of native talent in costuming. About six months ago she invited a number of young artists to meet her at luncheon to plan for a practical exhibition of their work in her department. Most of these young people have been constant students of the costumes in the American Museum and have attended a number of informal talks there on the subject of the application of primitive designs to modern costumes and fabrics. Some of the costumes that resulted from this interesting coöperation are illustrated in this article.

Miss Jesse Turner, of Bonwit Teller & Co., is a most conscientious and appreciative student of the costume collections in the Museum. With the assistance of independent artists and her own capable staff, she has created many beautiful modern garments from ideas developed through this study. The type of garment she creates makes it possible for her to follow the documents as closely as her taste and experience suggest. For a number of years Miss Turner has traveled in the Orient, studying primitive costumes in their native environment. Her wide experience in creative research qualifies her to appreciate the artistic and professional value of the Museum collections.

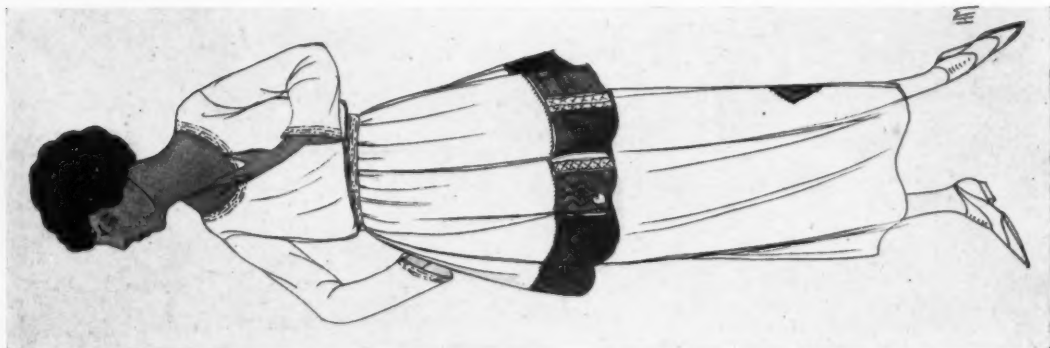
Mr. Edward L. Mayer and Mr. Max Meyer are wholesale manufacturers of exclusive costumes. Their creations no doubt are worn by many readers of this JOURNAL, but have passed unidentified through the hands of some retailer, specialty shop, or dressmaker. Men of their standing in Paris would have received public recognition long ago, but unfortunately in America there has survived a faint prejudice in favor of imported goods. Where this prejudice is expressive of superior merit, it is of course quite proper, but the very words "imported" and "domestic" have been distorted from their true meanings and have come to infer excellence and lack



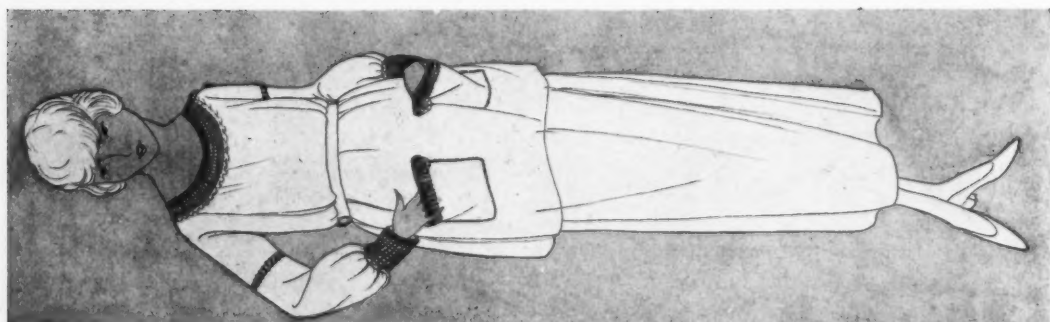
DECORATION OF AFRICAN ORIGIN.

A negligee executed in wistaria velvet, the design being produced with wool embroidery in multiple harmonious colors. It was developed from a garment in the African collection of the American Museum, the decoration being virtually the same but the silhouette somewhat modified. *Courtesy of Bonwit Teller & Co.*

LEFT FIGURE — The design for the silk used in this dress won first prize in the First Annual Albert Blum Contest for Hand Decorated Fabrics. The artist, Hazel Burnham Slaughter, got the motive from the South Sea Island collection in the American Museum. The design was purchased and executed by H. R. Mallinson & Co. *Courtesy of Edward L. Mayer*

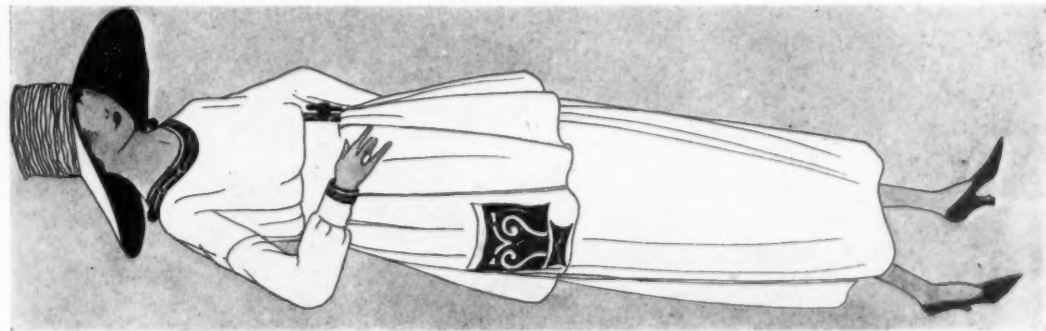


MIDDLE FIGURE — Linen sport dress with crocheted decoration. The idea of the blouse was taken from the Philippine collections. *Courtesy of John Wanamaker*

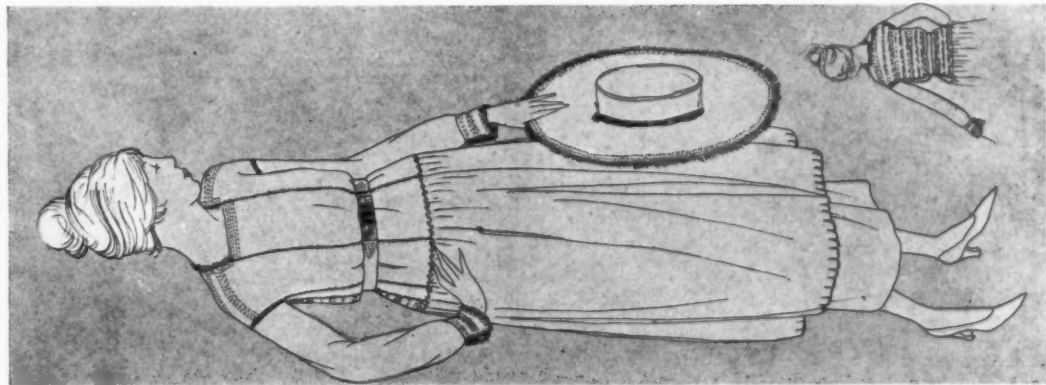


RIGHT FIGURE — A linen sport dress, on which the decorations are reproductions of Russian peasant embroidery. The type of the blouse was suggested by the Philippine Island collections. *Courtesy of John Wanamaker*

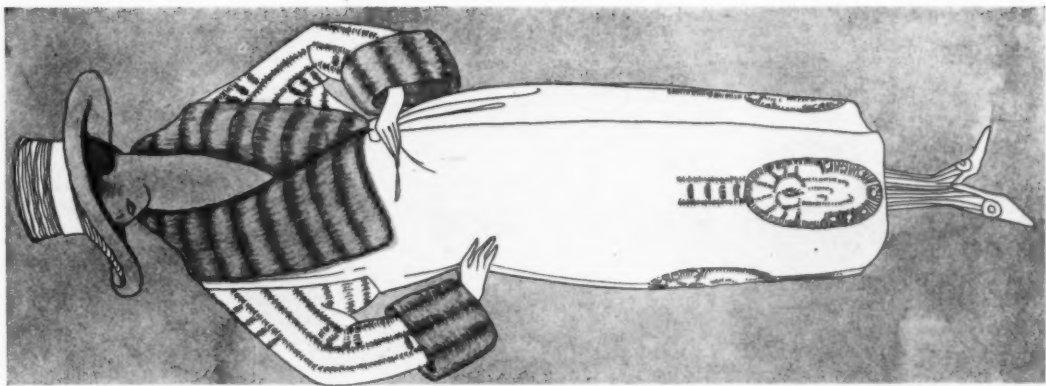




LEFT FIGURE — The decorations on the yoke, girdle, cuff, and pocket of this sport dress were designed from the Ainu coats in the Chinese hall of the American Museum. They are a combination of appliqué and embroidery, as in the originals. *Courtesy of John Wanamaker*



MIDDLE FIGURE — A sport dress created from the blouses of the Bagobo tribe, Philippine Islands. *Courtesy of John Wanamaker*

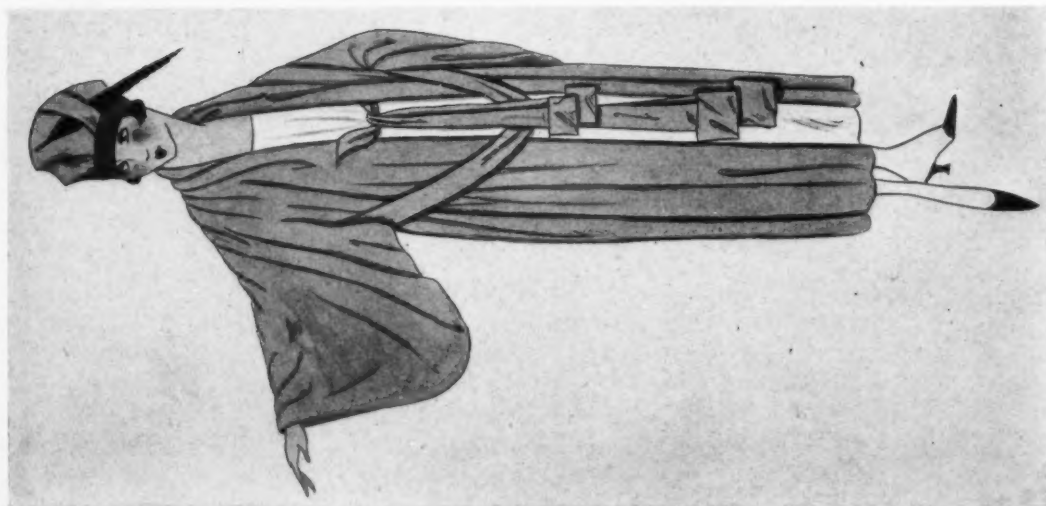
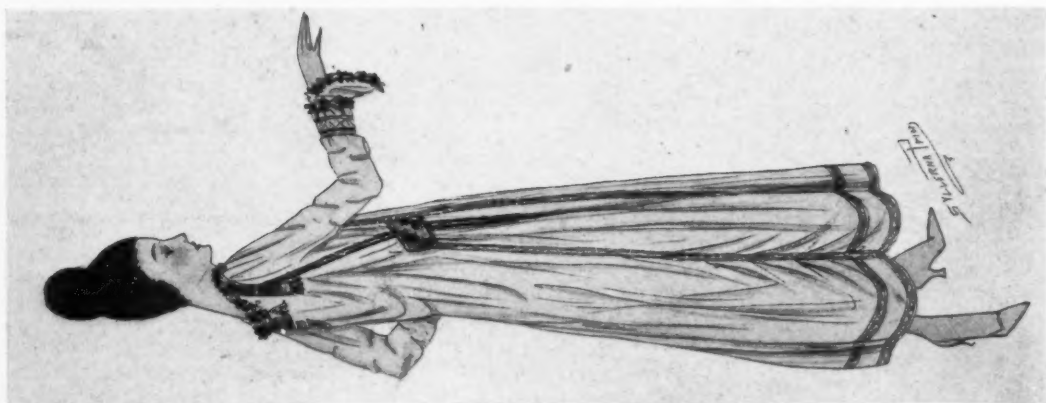
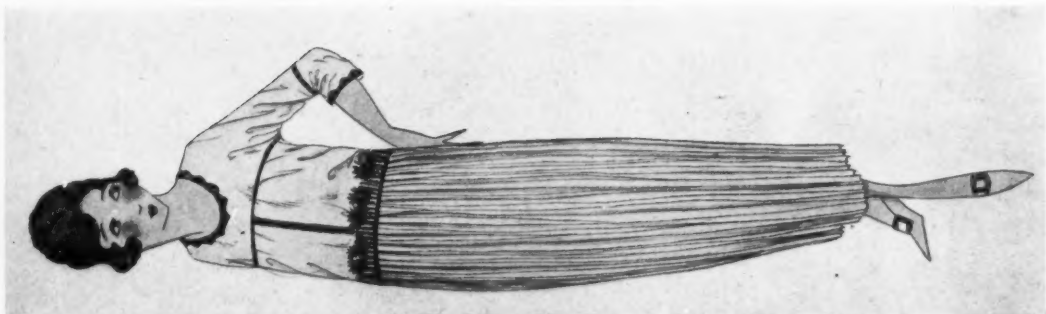


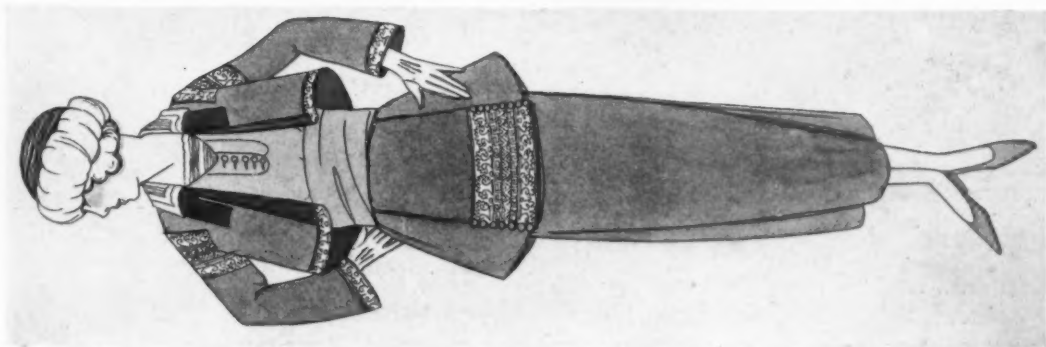
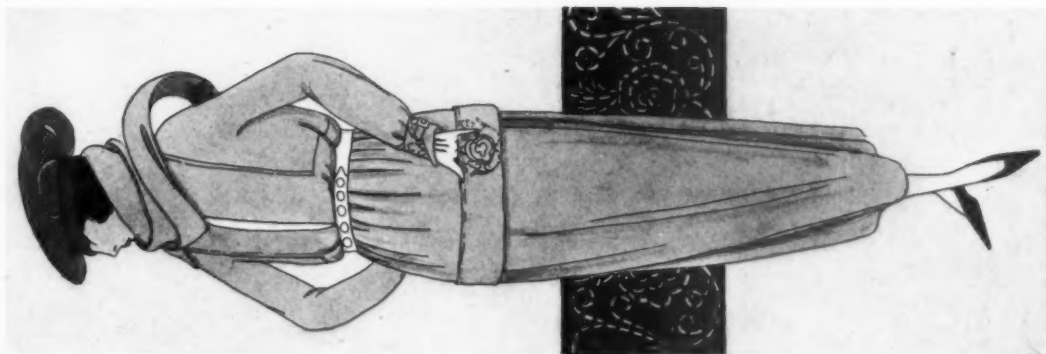
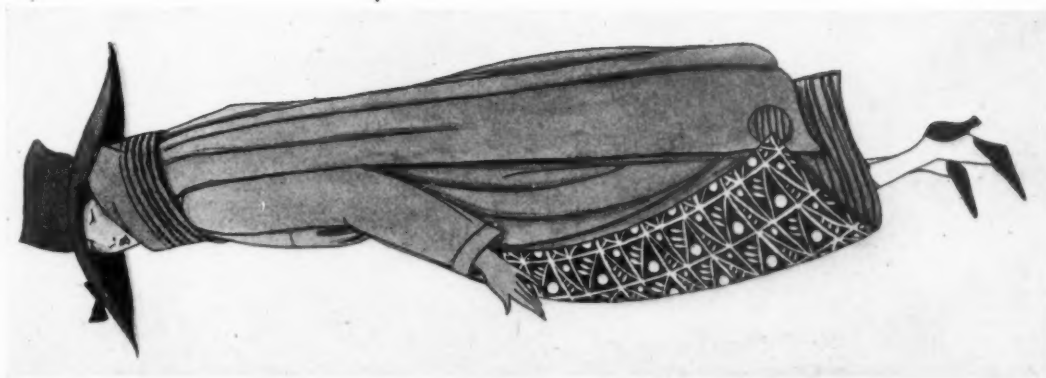
RIGHT FIGURE — A coat of white wool jersey, embroidered in white wool and trimmed with squirrel fur. The decorations on the lower edge of the coat and the form of the sleeve were suggested by the Koryak fur coats in the Russian hall. *Courtesy of A. Beller & Co.*

LEFT FIGURE — Automobile wrap in pongee silk, practically an exact copy of a Korean grass linen garment in the collections of the American Museum. *Courtesy of John Wanamaker*

MIDDLE FIGURE — A dinner gown in chiffon and wool embroidery developed from a Bagobo blouse in the Philippine Island collections. *Courtesy of Bonwit Teller & Co.*

RIGHT FIGURE — Afternoon dress of white crêpe de chine, with wool embroidery. The form of the blouse is practically copied from a Bagobo costume in the Philippine hall. *Courtesy of John Wanamaker*





LEFT FIGURE — A tailor-made suit in blue serge with embroidery on a dull white surface. The spirit of the decoration and its position on the shoulders and around the cuffs were suggested by an embroidered blouse of the Philippines. *Courtesy of Edward L. Mayer*

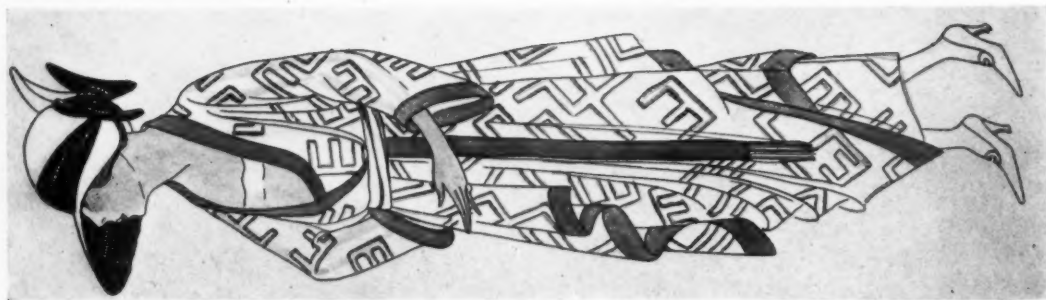
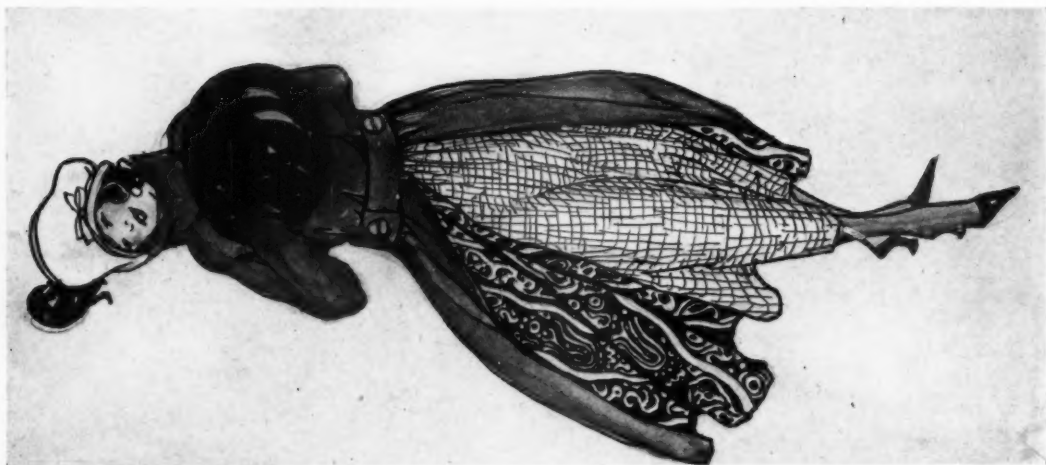
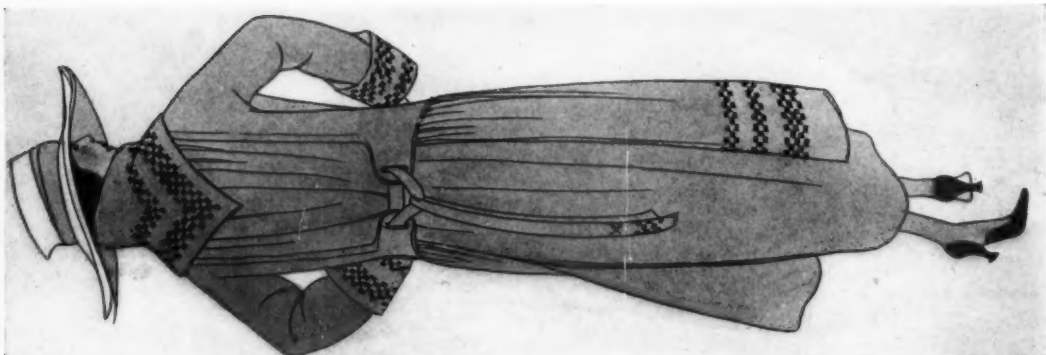
MIDDLE FIGURE—The sleeve of this garment was suggested by a Philippine blouse and the design of the embroidery was derived from the Amur River collections. *Courtesy of A. Beller & Co.*

RIGHT FIGURE — The back panel of this coat was suggested by a document in the Chinese collections of the American Museum. The lining is an imitation in silk of South Sea Island tapa cloth. *Courtesy of A. Beller & Co.*

LEFT FIGURE — The design of this material, a silk voile, was suggested by that on a piece of pottery in the Museum's collections from the American Southwest. *Courtesy of Edward L. Mayer*

MIDDLE FIGURE — A sport coat, the lining of which was suggested by the South Sea Island collection. This design won third prize in the First Annual Albert Blum Contest for Hand Decorated Fabrics. The artist was Martha Ryther and the design was purchased and executed by H. R. Mallinson & Co. *Courtesy of Edward L. Mayer*

RIGHT FIGURE — A sport coat, with embroidery decoration based on primitive basketry. *Courtesy of A. Beller & Co.*



of excellence. All fair-minded people will agree with me that the intrinsic merit of the productions themselves should be considered, rather than the geographical location of manufacture. If the professional reputation that these two gentlemen enjoy was passed on to the public, it would be not only a fitting reward for their years of patient effort, but also an encouragement to other artists in the same field.

In all forms of decorative art today, there is evidence of higher standards. The public taste has advanced during the past decade in an unmistakable manner. No doubt the great prosperity in America, the more settled economic conditions, the diffusion of art education among the people, have all contributed to this condition. The influence of art schools all over the country is making itself felt in the public's heightened appreciation of what is really fine in decoration. That there is still a great work ahead of us—that many of the methods of teaching need modification and amplification—does not alter the fact that propaganda of a highly important character has been spread abroad. We should lay more stress on practical craft work; we must accord to our native talent the recognition we so freely yield to foreign artists; and, lastly, we must make ample provision for training artists to our industrial problems and ensure to them legal protection for their ideas.

The Museum's share in this broad problem is a very important one. Its public halls are a constant influence toward good taste; and the facilities it offers to specialists for research, enrich beyond estimate our industrial arts.

Space does not permit a detailed discussion of this latter phase, but perhaps a condensed statement of some remarks that are constantly coming to my ears may not be out of place. Fabric designers and costumers of prominence are simply astounded at the wealth of suggestion that the collections offer to them. I quote from a letter recently received from Mr. Edward L. Mayer: "We have found its collections full of inspiration, and it a storehouse of decorative detail. A sympathetic appreciation backed by an adequate technique should make it an active influence in ours as in all the arts and crafts." This is but one example of many I might quote. Second only to the artistic value of the documents themselves is their accessibility. The freedom from red tape, the constant interest and assistance of the scientific staff of the institution, are matters of the highest praise.

The problems of the fabric and costume designer are many-sided. Success in either of these professions requires special training and a special viewpoint. But however intricate the question becomes, each fresh creation must be based on some suggestion or idea, and the Museum collections (open as they are and free from all unnecessary restrictions) offer a wonderful field for research of this character. The work has grown so rapidly and has entered into so many different phases that it is impossible to keep trace of the results any longer. But it is not too much to say that the American Museum is a full generation ahead of the other forces that are working for good decoration in this country.



LOUIS POPE GRATACAP, 1851-1917
LATE CURATOR OF MINERALOGY AT THE AMERICAN MUSEUM OF NATURAL HISTORY



"Competition of the Centuries"

By L. P. GRATACAP

A nature wise

With watching from the dim verge of the time

What things to be are visible in the gleams

Thrown forward on them from the luminous past.—LOWELL.

The JOURNAL publishes on succeeding pages many words of appreciation and praise of the late L. P. Gratacap, but it could publish nothing about him which would stand as so powerful a revelation of character and so forceful a memorial as his own words quoted below. They are taken from a speech delivered at the Annual Dinner of the Associate Alumni of the College of the City of New York, in 1901, almost two decades ago, yet, in many ways, might well have been said today. It is a privilege to present them here.—THE EDITOR.

A moment ago I uttered the word *years*, and as the vibrations of the sound passed from my lips through this intervening space of air, touched the delicate tympana of your organs of hearing, and awoke motions that were communicated to the reportorial activity of that group of bones which Professor Draper insisted should appear on our examination papers in physiology, and passing by filamentous nerves reached the receiving brain, and there stirred the conscious mind, what fancies, what regrets, and among the younger members of us, what tumultuous anticipations, did it not arouse!

I know the subject of years is a delicate one. We have grown accustomed to believe that the fear of age, and especially of its confession, is a feminine foible, but I have noticed in a lifetime, not altogether unob-servant, that it is also a masculine weakness, usually met with masculine intrepidity in the form of an unmitigated lie. For my own part, and speaking in the confidence of post-prandial satiety, I think I can say in all frankness that I no longer feel any timidity about the confession of my years. I have passed that transition period when I viewed with apprehension my increasing grayness and the widening of my tonsure, and when I indulged in an imaginative struggle still to retain a despairing clutch

upon that part of my life I had called my youth. Now resignation, filtering down through all the porous and susceptible surfaces of prevarication, has so hardened me that I can meet with equal coolness and equanimity the inquisitorial needs of the polling clerk and the gentle importunity of the census man.

But years are not simply matters of personal reflection. Years are those chronological atoms which build up the centuries, those temporal molecules whose incessant repetition fills out the everlasting voids of time. Behind us is that vast accumulation of mounds we call the nineteenth century; and even while I am speaking, the ticking of the clock and the infallible motions of the stars are forming the outlines of a new era.

We are to be the witnesses of the "Competition of the Centuries," and some here may survive long enough to be the arbiters of the supremacy of one or the other. It seems to me that men of my years who are not so young as to seek self-immolation in the membership of a football team, nor so old as to consign their physical activities to the discretion and dispensations of a doctor, may hope, as they have seen the achievements of the nineteenth century, . . . to be able to determine the motions and meaning of the twentieth. Certainly we all, at

present, on the 26th of January, 1901, belong to the nineteenth century, and as we look back upon it, how great it appears! From those first years when Napoleon, with avenging violence, stepped out upon the plains of Europe and smote its traditionary monarchies to dust and shame; from those early days when Dalton, with painstaking and scrutinizing care, devised the theory of atoms, which today solves the mystery of chemical mechanics; from that young decade when Channing brought to the pages of the Old Testament the spirit of reconciling grace, how there has swept through it from end to end the antiseptic winds of thought, cleansing from out the crannies of its civilization the miasmas of superstition and the hideous contagions of fear.

If with one word we should attempt to characterize the spirit and the results of this age, that word would be *Knowledge*.

In chemistry, from the first crude beginnings of analysis through the successive discoveries of more perfect methods, the splendid speculations upon the differentiated cycles of the elements, to these days of rapid industrial improvement, when in every avenue of manufacture the beaker glass and the balance of the chemist determine the force and feasibility of each new investment of capital, how astounding has been the progress of knowledge!

The new elements, the new views on the composition of compounds, the new compounds themselves, the subtlety of those processes of inspection by which the air we breathe is split up into new and precarious parts, are all contributions to the vast and overwhelming depositories of knowledge.

In geography, we have pierced the secret places of the world, are engaged in ransacking to their furthest limits their territorial secrets, have even consolidated the Powers in a mutual contract of plunder upon all their available resources. In astronomy, the terrifying abysses of space have responded to the occult touches of photography. In medicine, the scenic splendor of a complete reversion of the ghastly armies of torture and shameless pain has unrolled before our eyes its transforming tableaux. Knowledge in this regard has entered our daily lives, and taught us to walk with dry feet, and warm bodies, and renovated lungs.

In natural science, the endless series of the creations of nature have gone already

into card catalogues, and even the story of creation itself stares every schoolboy in the face.

In mechanics, invention, which is applied knowledge, has made the work-a-day world a vast concatenation of boilers and pistons, cogs and levers. In physics, we are entering upon deep and far-reaching schemes of thought and application, and by night our earth rolls through space, an orb bathed in the glory of its own radiance.

In business, knowledge has taught us our selfish interests, and great combinations of capital spread their titanic webs in silence where once the inarticulate clamor of contest spread panic in the commercial agencies, and filled the sheriff's office with fees.

Not indeed that this portentous silence seems altogether healthful or auspicious, but it is one form of that knowledge which rises everywhere, like an effluence of the human mind, from the nineteenth century. In war, knowledge has taught us the economy of slaughter, and we may soon expect that conflicting generals will play whist with each other over telephone wires while their fighting machines effect the necessary amount of carnage in an adjoining field, and the interested taxpayers wait for the results in the evening's extras.

Knowledge—I trust I speak with respect—has entered the pulpit, and in that unaccustomed citadel has added a new virtue to the church. But why epigrammatize longer? Every day the papers are engaged in proving to us the pertinacious fact that in the nineteenth century the human mind has striven with unabated and reckless energy to drive out mystery from the world, to dissect the unknown, and to nail upon the pillars of the temples, "All are free."

But let us not be deceived by our enthusiasm for an unrealized ideal. Mystery yet remains, the unknown, yet unabashed, sits in the nectar-sprayed corolla of every flower, and you and I, the protagonists of liberty, yet limp with shackled minds, and beneath the firm glance of defiant hope carry the quivering lip of suspense and doubt.

With all our laboriously gathered facts, we still fail to touch the hidden recess in which sits the supreme fact. With all our multitudinous books, we fail intelligently to display the Essence, or should I say the Entity, of which all facts are but the ex-

pression and symptom. With all our interminable analyses, refined to the intense circumscription of microscopic areas, we fail to put the needle point of our objective upon the exquisite pulse of *life* itself. . . .

We cannot certainly say what is matter, or what is energy; and when we turn to the baffling problem of the conversion of atomic motion into mind, we find the Ariadne thread of research suddenly cut short.

But leaving scientific or philosophical enigmas aside, and looking at this great world as human beings endowed with supernatural ambitions, how clear, or luminously full of purpose does it seem. See this phantasmagoric earth, its wars, its famines, its pestilences, and its bewildering obstructions! Read its history, the unintermittent struggle, the sacrifice of the individual, the underlying untold tragedies of millions of workers, the subterfuges of vanity, the deceits of greed, the mockery of pretension, the hurly-burly of doing and undoing, of everlastingly getting there and never getting there. It may be one increasing purpose runs with the process of the suns, but is its vindication very clear, or is it at all merciful?

Now is it possible that the twentieth century will supersede all competition by bringing revelation to fix and justify knowledge? Can it be imagined that a voice, a touch, a presence, outside of human effort, or study, or sentiment, will illuminate it with a transfiguring message, shall insert the rectifying key into the run-down machinery of our common faith and bring to some proper plane of realization the present helplessness of our songs and our psalms?

Let us be honest. The reading over of impossible statistics does not constitute the highest form of elation. The building up of more and more unwieldy encyclopedias is all right, but if there is no confirming and conforming progress in the social fabric, . . . they are all wrong. I do not wish to particularize. I would not dare to lift a sig-

nificant finger at the problems you are hammering at today here in New York. We all know the world moves; that sanitation and cheap clothing and department stores have alleviated the domestic burden and covered the nakedness of man. . . .

But, my friends, the spiritual sense of man is dying. Will the twentieth century light again its consuming fires? It is not necessary to ask for fanaticism. How often we pinch ourselves to find out whether we believe in anything at all.

But our spiritual sense will not endure a prolonged famine. Behind a sentiment there must be the overmastering touch of reality. Let me speak boldly, even at this convivial feast. *The message of Christ needs today re-enforcement, re-establishment, re-incarnation!* Will the twentieth century bring it? Let us hail it in that hope; let us trust in it with that faith, and watch with expectant eyes for the light that never was on sea or shore, and listen with straining ears for the voice that shall revive the souls of men.

May it not be that at the end of the twentieth century our desolate humanity, prostrate upon the ruined throne of its high hopes, prostrate upon a grave of buried aspirations, prostrate upon the broken staff of an alluring but deceptive faith, shall lift its tear-stricken eyes into that unruven sky, that pitiless and voiceless azure, that canopy of stars, in whose obscure depths not even the plummet of the inerrant telescope has ever yet found the vanishing threshold of any Heaven, and cry out, *Eli, Eli, lama sabachthani?*

No! No! Rather may it be that celestial voices shall re-awaken the orphic vision of man's supersensual destiny, and with new promises, and new premonitions, quicken the recognition of the divinity within him, and outside of creed or dogma, or book, or bell, or candle, bring upon the earth the apocalyptic glory of peace and righteousness and life!



Biographical Sketch of the Late L. P. Gratacap

By GEORGE FREDERICK KUNZ

President of the New York Mineralogical Club

THE late curator of mineralogy at the American Museum of Natural History, Mr. Louis Pope Gratacap, was born at Gowanus, Long Island, on November 1, 1851. He was of English and French ancestry. He received his education in the schools of New York City and was graduated in 1869 from the College of the City of New York. After a year in the General Theological Seminary, he entered the Columbia School of Mines, from which he was graduated in 1876. Thereafter he devoted his life to scientific and literary pursuits. He came to the American Museum of Natural History (then in the Arsenal Building in Central Park) in 1876, and was appointed assistant curator in mineralogy in 1880, curator of the department of mineralogy in 1909, and curator of Mollusca in the same year. He was a fellow of the American Association for the Advancement of Science and a member of the Society of Naturalists of New York City, as well as assistant general of the Natural Science Association of Staten Island.

In the death of Mr. Gratacap, on December 19, 1917, the American Museum of Natural History lost one of its most valued officers. Earnestly devoted to the study of mineralogy, Mr. Gratacap combined to an unusual degree a knowledge of minerals with a happy faculty of making this knowledge available for the benefit of the many students attracted to the Museum by its splendid collections. The work he accomplished in the cause of public education and in the diffusion of a love for mineralogy scarcely can be overestimated.

Mr. Gratacap was a pupil of Dr. Thomas Egleston¹—one of his most notable students. He was preëminently a "curator," and the

mineralogical and precious stone collection of the American Museum of Natural History, as it stands today, is probably the best displayed collection in this country or abroad. It is remarkable for its absolute cleanliness and for its labeling, and for the evidence of great attention given to specimens. Minerals require care not necessary in the case of many other exhibits, for a single hard touch may mean the permanent injury of a specimen and may result in the displacement of a brittle crystal, such as of sulphur, cinnabar, or wulfenite. With the work that his position involved, much of his time was consumed, preventing him—as has been the case with many other museum curators—from devoting the time to original work that would have been possible if he had assumed charge of a well-established collection rather than of one in its formative period.

In addition to his special activity as curator, Mr. Gratacap found time to write a great number of valuable papers for scientific journals on his favorite subject and to compose several books of sterling merit, in which may be noted a most happy blending of scientific accuracy and wise popularity. Examples of the latter are his "Geology of the City of New York" and "Popular Guide to Minerals." Among the many papers contributed to scientific journals, a group devoted to early museums in New York City, and to the rules to be followed in constructing and arranging a typical museum, is especially worthy of attention as embodying the study and experience of one who had large practical knowledge of this subject.

In his "Formative Museum Period," Mr. Gratacap reminds us that "scientific activity developed more slowly and was less encouraged in New York in the earlier years of this [last] century than in its neighboring rival cities, Boston and Philadelphia." This he attributes, reasonably enough, to the predominant New York interest in mercantile pursuits. In the decade prior to the establishment of the American Museum of Natural History, two societies, the New York Academy of Sciences (founded in 1817 and

¹ Dr. Thomas Egleston was professor of mineralogy at Columbia University and founder of the School of Mines of that institution opened in 1864. He was an American but had studied in the École des Mines of Paris. He elaborated for the New York school the system of installation of collections which existed in the École des Mines. The impress of Dr. Egleston's work is distinguishable in many of the museums throughout the United States, whose curators had been students under him.

since 1876 called the Lyceum) and the Torrey Botanical Club (1870), "were the guardians and shrines of the scientific life of the city."

There are very many articles by Mr. Gratacap treating ably a variety of themes. In the Museum Guide Leaflet, he passes in review the principal donations of minerals, the Clarence S. Bement collection, which constituted the nucleus of the Museum's mineralogical display, and the Spang collection acquired in 1891. An interesting paper is that on the singular class of clay stones and concretions which occur in clay beds of recent or Quaternary age. Devoted to a study of certain aspects of plant life, is a paper relating experiments on plants with solutions of hydrochloric, nitric, sulphuric, and carbolic acids. Certain fossils and traces of extinct animals in the Triassic rocks at Weehawken, New Jersey, furnish material for another paper. An interesting study of a very restricted area is that treating of the flora and fauna of Central Park. The important question of the "zoic maxima" of fossils forms the subject of a paper in which the irregular distribution of fossil remains in the successive strata of fossiliferous rocks is considered to depend upon causes still in operation today.

In his "Palaeontological Speculations" Mr. Gratacap recognizes the "valuable results secured by surveys like that of New York in the search for those variations whose accumulated force ushers in new forms in the life series, and by whose action on the organism as a whole a kinetic influence is established in a new direction." A more special study in his favorite field of mineralogy is that of a splendid calcite from Joplin, Missouri. The fascinating aspects of far-away Iceland in a geographical and mineralogical direction are well presented in an article "In and Around Iceland," the minerals being specially treated in another paper which gives interesting details regarding the calcite of Iceland, the famous "Iceland spar."

Endowed with an analytical mind, and having a wide scientific culture, Mr. Gratacap was a prolific writer. In addition to his great amount of published material he has left a considerable number of unpublished manuscripts.

As a slight illustration of the high degree of appreciation accorded to his character and

achievements by those who long knew him, we add here a few items and extracts from letters recently sent to the writer.

Dr. Robert Abbe, who was a member of the City College class following, states that Mr. Gratacap's classmates were most deeply impressed by his oratorical abilities. Not only his eloquence, but his deep, resonant, and attractive voice compelled attention. He had a very distinguished manner, especially noticeable in an undergraduate; and he was admired and loved both by the members of his own class and those of the class below him. One could not fail to be impressed with his seriousness of purpose.

Director Charles A. Colton, of the Newark Technical School, writes that his acquaintance with Mr. Gratacap dates back to the latter's student days in the School of Mines, when it was his privilege to be his teacher in crystallography, blowpipe analysis, and mineralogy. He was always a most careful student, and "the surprise and pleasure on his face the first time he obtained a silver button in blowpipe analysis still lingers in my memory. . . . His trip to Iceland was a never ending source of pleasure to him, and he would often entertain his friends with reminiscences, in that pleasing modest way so characteristic of him."

The following testimony of Mr. Gratacap's classmate and best friend, Mr. George C. Lay, serves to explain the stimulating influence he exerted upon those who came in contact with him, either as students of mineralogy or in social and friendly intercourse: "Always of studious habits, wide reading and much originality, he was not only a prolific writer on scientific subjects, but was also the author of several novels. Very early in life he began a diary in which he recorded his travels and the incidents of his life with vivid and rich description. This grew to many volumes. Possessed of an enthusiastic, buoyant temperament, which in spite of all the disappointments and cares of life made him ever cheerful and optimistic, he never lost his intense interest in the struggles of suffering humanity. He was remarkable in his democratic habits, always appearing to put himself on an equality with those who associated with him, however humble, without loss of dignity, and his benefactions and his ever ready sympathy, so characteristic of his kind and genial soul, will long be remembered. He was gifted with a high sense

of humor and as a conversationalist he was almost unrivaled. No one could listen to him without imbibing fresh and charming impressions of life and without learning something of interest, which he drew so readily from his stores of learning and research. His modesty, and in the latter years his seclusion in his home life, prevented him from achieving phenomenal success as a lecturer, as would otherwise have been the case; for, gifted with a marvelous vocabulary and flow of speech, he fascinated his auditors by his voice and manner, by his wonderful charm and originality of thought."

One who knew Mr. Gratacap as early as his college years, Mr. Marcus Benjamin of Washington, D. C., considers him to have been an unusually able man, and gifted with great versatility. He says: "He was very modest and even diffident, and it may be that his personality prevented a greater appreciation of his real worth. As I look back over the almost half century since I first met him, I cannot but yield to him all honor and praise for his achievements."

Mr. Julius Hyman, another old friend and fellow student at City College, says of him: "Louis P. Gratacap was a wonderful man. To a superior intellectual ability he had added the power and charm of a wide cultural development. And yet withal he remained a man—a simple human who liked humans and liked to be with them. . . . By instinct and habit he was a gentle-man. A noble courtesy informed all his actions. . . . Endowed beyond the average with natural gifts, he was modest and retiring to the point of diffidence. . . . He had a discerning mind and ever kept his sense of proportion. He despised sham and pretense. He paid homage to merit. In his analysis of leaders of men, in his books on public affairs, he hastened to point out the good in them, and to emphasize the constructive side of their policies. . . . He was a great American, and he loved America greatly. He was for America first, last, and all the time—that America that was to prove the world's leaven. For him America was the justification of history. It was the leavening that would bring salvation to the world. He used to say to me, 'Hyman, America is the greatest experiment in democracy the world has ever seen. Ultimately the world must come around to us. If we go, then the world goes.' . . .

"Louis P. Gratacap was an optimist. He was perennially young. He had life-zest. He lived, felt dawn, saw sunset glow—and loved to describe it in felicitous phrase. He was always enthusiastic—never downcast; his was the Greek's *en theos*, the 'god within.' . . . He was of fine humor, at times almost boyish in its quest. Goldberg's cartoons, with their ingenious grotesqueries, would stir his risibilities much. He had a hearty infectious laugh. He enjoyed a joke and could tell a funny story. And he did love contemporaneous life—the life of our cosmopolitan New York. Of original native stock, he met the more recent Americans with a discerning eye and a mind of understanding. 'Where others saw but a motley crowd, he saw the soul of man behind it.' In old Trinity's churchyard, on that gentle southern slope, just where the daily flood tide of Broadway's bustling business men, clerks, and jetsam swirls into that swift current of bankers and brokers that comes rushing out of Wall Street's commercial cañon, in the very heart of that old New York he loved so dearly, a true *civis Novi Eboraci*, he now lies in peaceful rest. . . . 'His life was gentle, and the elements so mixed in him, that Nature might stand up and say to all the world, 'This was a man.'"

In a paper on Mr. Gratacap, read before the Staten Island Association of Arts and Sciences, Mr. William T. Davis said:

"The versatility of the man, as his bibliography will show when published, was quite remarkable. As a lecturer he had few equals, and his many ideas were not only presented entertainingly, but also through the medium of a remarkable vocabulary. It is related that ex-Governor Benjamin B. Odell, a guest at an alumni dinner, after listening to Mr. Gratacap, turned to the president of the occasion and remarked: 'That man a cold scientist? Why, if he went into public life, he would class with orators like Joseph Choate and Horace Porter.' But Mr. Gratacap did not care to go into public life; he was a student, and thought more of the quiet of his home, where after the death of their parents, he and his brother Thomas lived alone, except for the servant. He lived only for his work and for his friends. Very many can testify to his kindly acts both in financial and other aid."

The Tree of Saint Louis in the Forest of Fontainebleau

By WILLIAM A. MURRILL

Assistant Director of the New York Botanical Garden

THE forest of Fontainebleau, situated about thirty-five miles east of Paris, is the largest and most beautiful tract of woodland in France. Conspicuous among its trees are splendid oaks and pines and beeches, and the forest floor is covered here and there with dense undergrowths of bracken fern. Where the soil is sandy and water scarce, as at Franchard, picturesque gorges and passes appear with rocks heaped about in confusion and stretches of heather with an occasional stunted juniper or skeleton of a dead tree, presenting the greatest contrast to the subdued and attractive forest depths.

While visiting Fontainebleau not long ago, I was struck with the number of trees

bearing the names of noted men. Most of these trees were oaks, named for Charlemagne, Clovis, Francis I, Henry IV, and others; but the one that attracted me most was a beech called the Tree of Saint Louis.

Louis IX, or Saint Louis, stood almost alone among the kings of France for virtue and piety. His piety was simple and fervent, his life frugal, honest, and chaste. Tall, strong, keen-eyed, and sanguine, he delighted in the dangers of the chase and was calm and fearless in battle. The strife of his early years and the disasters of his crusading expeditions served only to develop the sterling qualities inherited from his mother, Blanche of Castile, and at the end of his reign he was the first prince in Eu-



Beeches in the largest and most beautiful woodland of France, the forest of Fontainebleau, about thirty-five miles east of Paris. Many of the trees in this forest are named for noted men,—this view is from a great beech called the Tree of Saint Louis

rope, the exemplar of all that was best in his age and the very ideal of a Christian king. Under his just and beneficent rule France enlarged her boundaries and made great advances in learning and the arts. The exquisite Sainte Chapelle, built by him in 1245, may still be seen in Paris; in the palace at Fontainebleau visitors are shown the Salle de Saint Louis; and in the forest, on a main road leading from the palace, is this aged beech, the Tree of Saint Louis, bearing many scars on its trunk and branches from rough handling by wind and weather, but apparently sound and healthy still.

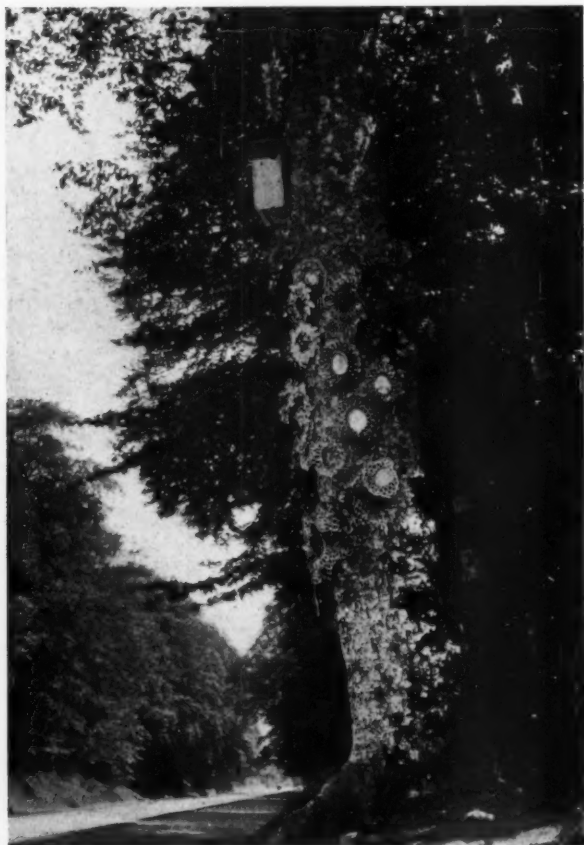
Under this tree the king and his court, a large and brilliant company, assembled to worship. The custom was especially in vogue at the close of the seventeenth century

when Louis XIV created the royal and military order of Saint Louis and designed a medal bearing his image. This manner of worship doubtless had its origin in druidism, which was common among the Gauls in the days of Julius Caesar. Druids were then men of rank who practised mystic rites in woody retreats and held the oak sacred, esteeming everything that grew upon it a special gift from heaven. Druidism resembles oriental pantheism and is probably connected with the ancient religion of the fire worshipers in the plains of Persia, where the plane tree was venerated. Why the beech was chosen in this instance instead of the oak it is impossible to determine with certainty. I noticed, however, that the beech is very abundant and very beautiful in this part of the forest, that the region is level

and easy of access to parties coming on horseback from the castle, and that its distance, as well as its attractiveness, must have made it a very desirable spot for ceremonies of this kind.

The ornaments upon the tree are crowns of beads placed there by the peasants of the neighborhood. After the French Revolution, such homage to royalty was judged illegal and forbidden, but the descendants of the old servants who were driven from the palace by the Revolution still cherish the ancient custom and come for miles during the night with their tributes to Saint Louis. These crowns or wreaths of woven beads are commonly used upon graves and monuments. The statue representing the city of Strasbourg, in the Place de la Concorde, has been decorated with them continually since Strasbourg passed into the hands of the Germans. They also constitute a large part of the offerings of lovers at the tomb of Abélard and Héloïse in Père-Lachaise.

The historic associations connected with the forest and castle of Fontainebleau are of



The Tree of Saint Louis (Louis IX) has added ring after ring of wood slowly marking the years of all the centuries of French history from about 1200 A.D. until today. The peasants of Fontainebleau still hang crowns of beads upon the tree in memory of the pious king whose name it bears

peculiar interest and cover a large and important part of French history. The forest has been used from very early times as a royal hunting ground. Importance was first given to it by Louis VII, who, after returning from a disastrous crusade, erected upon the spot which the present palace occupies a fortified castle in which he held his court. He also dedicated there a chapel to Saint Saturnin, which was consecrated by Thomas à Becket, then a refugee in France.

While the earliest settlements were being established in America, Louis XIII at Fontainebleau was entering upon a career which, with Richelieu's help, was to lay the foundation of the most glorious period in the history of France. Hither Henry IV had come with Gabrielle d'Estrées and later with Queen Marie de Médicis, and here young Louis was born and baptized, and from Fontainebleau went forth to the early struggles and successes of his long and eventful reign.

Louis XIV, though born at Saint-Germain and occupied with the construction of Versailles, still retained Fontainebleau as his autumn residence, where he went to hunt and to enjoy the exhibitions of new plays intended for the French stage. It was here in 1685 that this tyrannical and bigoted monarch signed away the rights of the Huguenots granted to them nearly a century before by Henry IV in the Edict of Nantes.

The marriage of Louis XV to Marie Leszczinska, of Poland, was celebrated at Fontainebleau; but the names of De Châteauroux, De Pompadour, and Du Barry, who succeeded one another in the favor of the king, have attracted more attention than that of his Polish queen. It was a period of license and of petty jealousies during which Fontainebleau was the scene of many personal and political intrigues. Sentimental and unorthodox literature was also much in vogue. Hither came the brilliant and versatile Voltaire to see his plays produced;

and here Rousseau, after witnessing the phenomenal success of his "*Le Devin du Village*," lost courage at the approach of his presentation to the king and hurriedly left the palace without a farewell and without a pension.

The time-honored custom of spending the autumn at Fontainebleau was continued by Louis XVI and his queen, Marie Antoinette. During these visits the king gave himself over to the pleasures of the chase or worked with his locks and bolts. The queen especially looked forward with delight to the freedom and quiet and native beauty of a forest unrestricted by the narrow boundaries of Versailles and beyond the reach of its cares.

The apartments of Napoleon I form an attractive feature of the castle: a large part of the garden, also, was laid out in the English style under his direction. It was during his residence at Fontainebleau that Napoleon willfully put away the Empress Josephine for Maria Louisa; here he was forced to sign his abdication of the throne of France for the empire of Elba; and here, in the Cour du Cheval-Blanc, he bade a touching farewell to the soldiers of the Old Guard, to greet them again on the same spot upon his return from Elba the following year.

And the Tree of Saint Louis has lived through it all, defying time and change as kings and centuries have passed; and, with ring after ring, has slowly recorded the years. Some rings have been thick, others scanty; some even, others uneven. As it is with the tree, so it has been with France: there have been years of plenty and want, of peace and war, of prosperity and adversity in her history. It is to be hoped that the peasants of Fontainebleau will not cease to hang wreaths upon the tree while it lives, or the French people cease to remember what they owe to the good and wise king whose name it bears.





THE LAST OF THE PICURIS RACERS

At the Picuris *fiesta*, August 10, 1917, in honor of San Lorenzo, patron saint of the village, which replaced the old time Scalp Dance, racing on the mesa was the chief feature of the day. The racers were variously decorated: some streaked their bodies with red, others painted them with fanciful designs in white clay

Last Dance of the Picuris

FOREWORD.—Taos and Picuris, the most northeastern of the New Mexican pueblos, unlike the others are not in the valley of the Rio Grande but at the eastern base of mountains which are really the southern extension of the Rockies. They were first described by Alvarado, lieutenant of Coronado, commander of the Spanish expedition of 1540-42, which was sent into the north from Mexico to search for the "Seven Cities of Cibola" with their reputed stores of wealth. Picuris early became the seat of the Franciscan mission of San Lorenzo, but when in 1680 the Indians made their great revolt against Spanish dominion, the Picuris killed their missionary, burned the church, and for a time abandoned the pueblo. By reason of their proximity to the Jicarillas in later times, the Picuris have a considerable infusion of Apache blood. Annual *fiestas*, curious mixtures of Christian and pagan practices, are held at almost all of the pueblos.—P. E. GODDARD.

PICURIS is situated among the mountain peaks of Truches, in northern New Mexico, more than eight thousand feet above sea level, the highest Indian village in the Southwest. Many travelers in this strange corner of the United States have looked toward the purple-veiled mountains, little realizing the great drama that was being played there. Difficult of access and far removed from other pueblos, this village has been visited by few Americans, and is the last to feel the effects of civilization. It is said to have had three thousand vigorous inhabitants not so long ago; now it has only one hundred and twenty-three. Of these, the older men, who still possess a flicker of the fiery spirit of the tribe, are fast disappearing, while the young boys, who are being educated in the American schools, are losing reverence for their native religion and the customs of their people.

But it was not many years ago, say the historians, when this village of Picuris, because of its location in the rugged mountain tops and its highly defensible position against enemies, was very powerful. When the Spaniards conquered the Indians of New Mexico, the Picuris were the last to submit. Later, in the great Indian revolt, these Indians were the leaders. And when the Spaniards reconquered the Pueblo Indians, the Picuris moved to the plains of Kansas, but finally returned to their original home near the skies and near the burial mounds of their ancestors.

During the summer of 1917 there was talk in the Southwest about a revival of the once famous Scalp Dance which was to be given at Picuris. A number of writers and artists sacrificed considerable personal comfort in the hope of witnessing this weird ceremony. A long hard drive over forty miles of "going up" mountain road, and a bed on the ground, were only part of the sacrifice. There was no Scalp Dance, however. The Scalp Dance is no more—and never will be danced again.

In this village of Picuris was a castle called "Casa Vieja," a guarded communal house, in the tower of which, history relates, was a collection of bloodstained scalps of enemies conquered hundreds of years ago. These had been cherished as sacred relics, gruesome reminders of the days when the stalwart Picuris were brave warriors and the fear of invaders.

When I visited Picuris I expected to see these bloody trophies carried in the dance procession. But I was disappointed. The "Casa Vieja" is in ruins. It is now only a fallen pile of adobe. The old men of the village when asked about the scalps said, "*Quién sabe*," and shook their heads sadly. The young boys who had learned to speak English seemed ashamed, and professed ignorance of any such feature of the dance. Inquiries were made throughout the day of the dance, but all that could be learned was that these trophies had disappeared mysteriously about three years ago.

Instead of the Scalp Dance, the Picuris Indians, on August 10, danced in celebration of the annual *fiesta* of San Lorenzo, their patron saint. Early in the morning, crowds of native Mexicans in horse-drawn caravans, and reckless riders galloping their horses, began filling the plaza in front of the old church. This is said to be the only old Spanish mission church of the Indian pueblos that was built by the ancient system of construction, that is, by preparing a mortar of adobe earth and pouring it into molds to form the walls. After the church services, a statue of San Lorenzo was carried at the head of the procession of dancers, each dancer kissing the garment worn by the image. After many blows on an ancient bell and many volleys from old muskets, the Indians marched from the church to a high mesa where the races were to be held. Here the twenty-six dancers separated into two groups of thirteen each which were stationed at the two ends of the race course; two men started at the same moment, one from

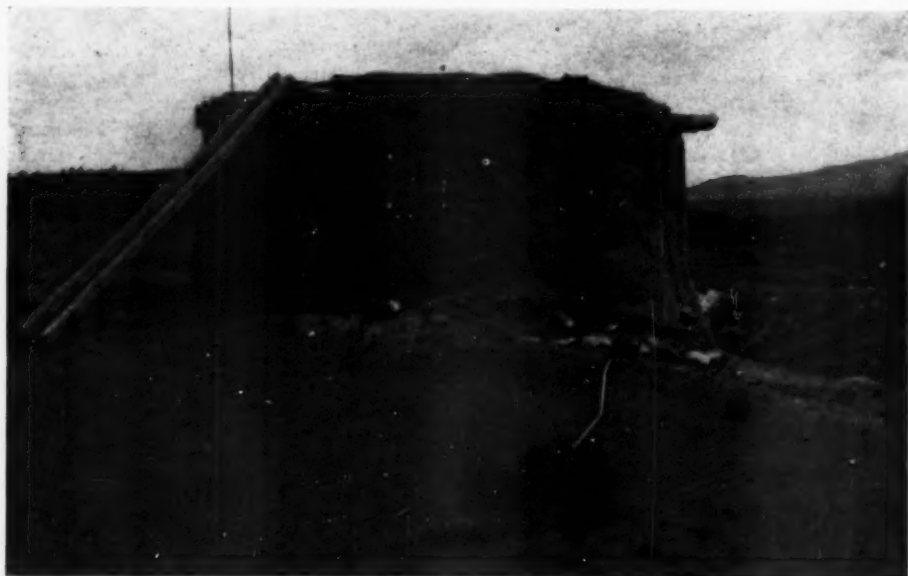


The ruined "Casa Vieja."—In this communal house were once kept as well-guarded sacred relics the scalps of enemies conquered centuries ago. These were brought out only on the occasion of the annual Scalp Dance. All that now can be learned from the Picuris is that these trophies have mysteriously disappeared

each side respectively, and the point at which they passed each other determined the progress of the race. As a racer ran the course and returned to his side, his place was taken by another racer, and so the game continued with its interest centered around the point at which the dancers passed, this point moving first toward one goal, then toward the other—reminding one of the yard gains of a football team. Each racer appeared with different bodily decorations.

Some had streaked their bodies with red, others had made themselves grotesque with white clay in fanciful designs.

The governor of the pueblo kept score by marking the progress of the race with large leafy branches. The governor of the Picuris carries two silver-headed canes. One was presented to some former governor by President Lincoln, whose name is inscribed on the head. This has become the only mark of the governor's office. The other



Once so many Picuris warriors took part in the dances that five sacred chambers, or kivas, were needed. In 1917 the ceremony, which formerly lasted from sunrise to sunset, was performed in scarcely thirty minutes, and the few participants disappeared into only two of the kivas

cane was presented by the King of Spain when these Indians were under Spanish rule, before the United States acquired the territory. On feast days the governor carries these insignia of his office with great pride and dignity.

When the race was over, the racers again formed two sections of thirteen each and began the "Dance of the Races." These two small groups presented a pathetic picture, trying to enact a drama in which formerly the chants of hundreds had echoed in these same mountain tops. The dance step of the old men had the masterful movement of the great past, and their chant was rich in the spirit they sent heavenward; but it was different with the short-haired Americanized boys. The performance was very brief.

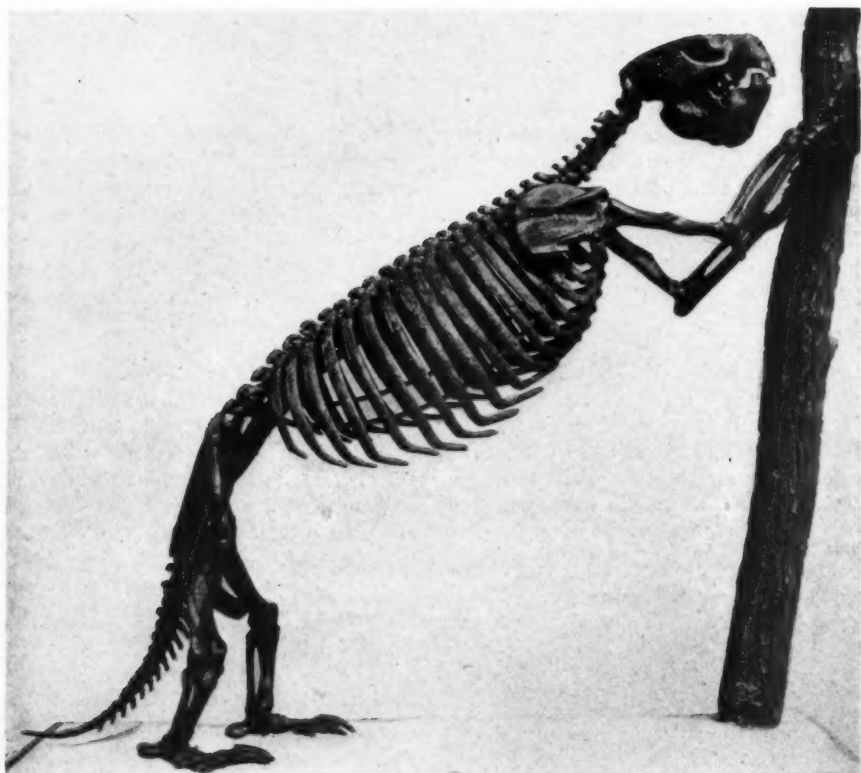
The groups of dancers passed through the plaza once, and then on to the kivas.

This Indian village once had so many dancers taking part in its *fiestas* that five kivas, or sacred chambers, were required, each accommodating a hundred warriors. This time the two small groups of dancers hurriedly closed the dance and disappeared into two of the kivas, leaving three vacant. In the olden days the dance started at sunrise and stopped at sunset. This dance lasted scarcely thirty minutes, and when the dancers disappeared into the kivas a death-like stillness settled over the famous Picuris pueblo, which made mourners of the handful of American visitors, who had seen the last dance of the Picuris.

—CHALMERS LOWELL PANCOAST.



The small group of Indians taking part in the Dance of the Races is in mournful contrast with the hundreds who in former years joined in the ceremony of the old time Scalp Dance. They are here about to enter the kiva at the close of the dance



The Cuban Ground Sloth *Megalocnus*.—The joint explorations by the Havana Academy of Sciences and the American Museum of Natural History secured materials to mount two skeletons of this prehistoric beast. It was about as large as a black bear and a rather distant relative of the extinct *Megalonyx* of North America. The upper figure shows the skeleton sent to Havana. The skeleton of the lower figure is on exhibition in the American Museum, in the hall of the Age of Man

Skeletons of the Cuban Ground Sloth in the Havana and American Museums

SOME years ago, on invitation of Professor Carlos de la Torre of Havana, the American Museum deputed Mr. Barnum Brown to investigate with him certain fossil localities in Cuba. As a result of this joint expedition a large collection of remains, chiefly of the extinct Cuban ground sloth *Megalocnus*, was obtained. From the materials we mounted two complete skeletons: one now stands in the hall of the Age of Man in the American Museum, the other was sent to the Havana Academy of Sciences Museum. The importance of this skeleton was appreciated highly by the scientific fraternity of Havana. It represents the first discovered and the most remarkable of the extinct fauna of Cuba, as yet very little known. The exercises at its formal presentation are published in the *Memorias* of the Poey Society, a scientific association founded in honor of the pioneer Cuban naturalist Felipe Poey; and in recognition of the part taken by the American Museum, three of its staff, Professor Osborn, Dr. Matthew, and Mr. Brown, were elected among the first honorary members of the society. The following extract is taken from the report of the secretary of the Poey Society, Dr. Aristides Mestre, for the year 1915-1916:

(Translation)

"The Poey Society we state in conclusion has finished by naming its first *honorary members*; has unanimously bestowed that title, the highest in its gift, upon two illus-

trious Cubans, Doctors Juan Santos Fernádez and Juan Guiteras; and upon three learned North American naturalists, Messrs. Henry Fairfield Osborn, W. D. Matthew and Barnum Brown. . . . They have contributed to decipher the enigmas which lie within the soil that we tread upon and to bring them back to life—reconstructing, through the procedures of science and the marvellous methods of an art truly amazing, beings which existed in epochs far remote from ours but which today it is possible for us to know and study.

And these three notable naturalists are joined—and it is of especial interest that we should note it at this moment—with the history of the *Myomorphus* or *Megalocnus rodens*, whose restored skeleton we see today in this hall, and in the earlier stages of whose palæontologic investigation Doctor La Torre was associated. Ah! if Poey could rise from his grave—which for our consolation is very near to this place—and contemplate it, even were it but for an instant, and directing his glance backward, recall to remembrance the description which he gave on the 15 September, 1861, of that fossil mandible from Ciego Montero, he might return certainly to tranquil repose after exclaiming with justified pleasure, 'My favorite disciple has brought to a satisfactory termination the work which I initiated half a century ago. What progress palæontology has made in those five and fifty years!'"—W. D. MATTHEW.

Notes

SINCE the last issue of the JOURNAL, the following persons have become members of the American Museum:

Fellow, E. H. DOHENY.

Life Members, MESSRS. ALBERT C. BURRAGE, MICHAEL J. CLANCY, ANSON W. HARD, JR., H. B. HARRIS, and C. H. SANFORD.

Annual Members, MESDAMES WILLIAM C. ATWATER, A. FREDERICK BEHRE, G. H. BEND, C. F. CHAMBERLAINE, and S. T. DE LEE, DOCTORS J. RIDDLE GOFFE and RICHARD KOVACS, MESSRS. E. F. ABELL, B. LORD BUCKLEY, GEORGE W. CHANDLER, WILLIAM V. COHEN, MARTIN L. COHN, RUFUS COLE, TIMOTHY F. CROWELL, BURRITT A. CUSH-

MAN, W. P. DEPPÉ, LEE DEUTSCH, HERMANN DITTRICK, WILLIAM A. DUNCAN, WALTER R. EIMER, STEPHEN C. HUNTER, FREDERICKO LAGE, CARLOS LA ROSA, JR., MONTGOMERY H. LEWIS, CHARLES E. MATHEWSON, JOHN B. O'REILLY, N. T. PULSIFER, and H. E. RAYMOND.

Associate Members, MISS LAURA ALICE JOSLYN, DOCTORS NEWTON CRAIG, OMAR F. ELDER, HENRY STEVENS KIERSTED, EDWIN LODGE, THADDEUS WALKER, MESSRS. ALFRED AUSTELL, THOMAS J. CHARLTON, F. H. DOUTHITT, DEAN EMERSON, JOHN A. MURTAGH, DUDLEY W. SMITH, VANDERLYNN STOW, and HENRY P. WILLIAMS.

FREE lectures by members of the scientific staff of the American Museum of Natural History will be given to public school children on Mondays, Wednesdays, and Fridays, at four o'clock, throughout April and May. Three courses are scheduled, covering eight talks on geography, eight on United States history, and eight on natural history. These lectures are designed to supplement classroom work and will be fully illustrated with lantern slides and moving pictures.

DR. FRANK M. CHAPMAN, curator of ornithology, who is second in point of seniority on the scientific staff of the American Museum of Natural History, completed on March 1, 1918, his thirtieth year of connection with the institution. He joined as assistant curator of vertebrate zoölogy in 1888. He has, from the first, devoted himself chiefly to ornithology, attaining preëminence in educational and scientific work in that branch. The effectiveness and high ecological value of the large series of habitat bird groups in the Museum, which it is said by competent observers are second to no exhibits of birds in the world, are based on the careful observations made during his extensive field studies.

THE Geological Society of France has awarded to Professor Henry Fairfield Osborn the Gaudry Medal, which was established by the Society in the year 1910 in honor of the distinguished French paleontologist, Albert Gaudry. Previous awards of the medal have been to the following paleontologists and geologists: Albert Gaudry, 1910, Marcellin Boule, 1911, Henri Douville, 1912, Edouard Suess, 1913, Emile Haug, 1914, Charles D. Walcott, 1917.

At the annual meeting of the National Academy of Sciences, in Washington, April 22, 23, and 24, will be presented the sixth course in a series of lectures organized for the purpose of giving a complete history of the modern aspects of the evolution theory. The foundation of the series was a gift to the National Academy by the children of William Henry Hale, in memory of their father. The first lectures were given in April, 1914, by Sir Ernest Rutherford, F.R.S., followed by Dr. William Wallace Campbell, in December of the same year; by Professor T. C. Chamberlin, in 1915; Professor Henry Fairfield Osborn, in 1916;

and Professor E. G. Conklin, in 1917. Professor John C. Merriam, of the University of California, will deliver the present course, his subject being, "The Beginnings of Human History from the Geologic Records."

A NEW *General Guide to the Exhibition Halls*, edited by Director Frederic A. Lucas, has just been issued by the American Museum of Natural History. Numerous illustrations, together with diagrams of each floor and very full explanations and descriptions of groups and specimens, make this volume interesting and instructive to the reader as well as helpful to the Museum visitor.

THROUGH the courtesy of Mr. Leonard M. Davis and the Canadian Pacific Railway Company, the JOURNAL has been able to publish as a frontispiece for this number a reproduction in color of one of a collection of paintings by Mr. Davis, which will be on display in the American Museum from the middle of April until June 1. The exhibit includes about fifty small sketches and thirty or more large pictures of scenes in Alaska and the Canadian Rockies. Mr. Davis has made a life study of mountain scenery, and the excellence of his technique and grasp of scenic effects and color give great pleasure. The artist's paintings of Alaskan scenery won for him a silver medal at the Panama-Pacific International Exposition at San Francisco.

A LETTER from the Reverend A. Kok, of Li-kiang-fu, Yünnan, China, addressed to the president of the American Museum of Natural History, tells of the cordial relations that existed between the members of the Museum's Asiatic Zoölogical Expedition and the Chinese people of the regions where the expedition worked, and gives assurance of the writer's desire to aid in every way such undertakings in the future. He says: "Few foreign travelers have left behind such a good reputation among the population of these parts as the members of Mr. Andrews' party have done. To remember this is a pleasure to me, and, if they ever return to these parts they may be sure of a hearty welcome and every possible assistance."

A GROUP illustrating the nesting habits of hornbills, specifically, of the largest species of hornbill found in West Africa, has been placed on exhibition at the American Mu-

seum in the hall assigned to birds of the world. The hornbill in appearance, as well as in habit, is distinctive, the huge bill with its high casque giving to the head a grotesque appearance. There are seventy species, widely distributed over the warmer parts of the Old World. The Museum group has been prepared under the supervision of Mr. Herbert Lang, whose article in the present number of the *JOURNAL* describes in detail the nesting habits of this particular African species.

At a recent meeting of the New York Academy of Sciences, the effect of heavy shell fire on the human ear was described by Professor J. Gordon Wilson, of Chicago University. Complete deafness often is caused by the rupture of the tunnel of Corti in the inner ear, but in many cases temporary deafness may be cured or improved by a graded series of sound exercises, tuning forks being placed against the mastoid bone to stimulate the inner ear; later on, resonating boxes are used in the treatment. The speaker exhibited an improved instrument to be worn in the ear which protects it against shell shock without preventing ordinary sounds from being heard.

THE American Museum War Relief Association, which has been an active factor in the Museum since June 1, 1917, reports to date a very considerable amount of work accomplished through its various branches. Knitters for the Red Cross, Navy League, and for Museum men in the service have turned out 650 garments; sewers have made for the Red Cross 215 surgical shirts and 209 suits of pajamas; while the surgical dressings class, which meets once a week, reports an output to date of 10,000 pieces. In addition, during the recent Red Cross drive for garments to send abroad, energetic workers collected, sorted, and packed for shipment to headquarters one ton of clothes which were turned in at the Museum station. It is the aim of the Association to keep in touch as far as possible with the American Museum men who are in the service, and thus far twenty-two of these have been furnished from time to time with comfort kits, knitted garments, candy, and tobacco, as well as with reading material and letters. Money for carrying on the work of the organization is raised through monthly subscriptions obtained from members of the

Museum staff, and through the generosity of Mrs. Henry Fairfield Osborn.

THE *Museum News Letter*, a small publication which had its inception at the 1917 meeting of the American Association of Museums, supplies an actual need in the way of furthering coöperation between educational institutions of this character, keeping them alive to one another's activities, and promulgating new methods of work. The leaflet is edited by Mr. Harold L. Madison, curator of the Park Museum, Providence, Rhode Island.

DR. HERBERT J. SPINDEN, assistant curator in the department of anthropology at the American Museum, is on his way to Colombia, South America, to make a general archaeological survey of that little-known country. It is a curious fact that since the time of Humboldt no one has advanced our knowledge of prehistoric Colombia. While on the whole we know very little about some sections of South America, Colombia is the one part about which we know least. Dr. Spinden plans to visit the more promising regions and to gather data upon the distribution and forms of archaeological objects. This will give a basis for future intensive work on the prehistoric culture of that country.

A BRONZE bust of the late Dr. Daniel Giraud Elliot, mammalogist and ornithologist, is installed on the second floor of the American Museum, in the hall devoted to birds of the world. The bust, which is the work of Mr. Chester Beach, is the gift of Miss Margaret Henderson Elliot, daughter of Dr. Elliot.

A VERY rare specimen of sea otter spear, formerly used by the natives of the Aleutian Islands, has been presented to the department of anthropology of the American Museum by Lieutenant George T. Emmons, of Princeton.

TWO canvases bearing realistic representations of the Dakota Sun Dance may be seen in a case in the southwest hall of the American Museum. These paintings, which are about six by two and a half feet in size, are the work of Short-bull, a famous chief of the Oglala Dakota (Sioux) Indians, now at Pine Ridge Reservation, South Dakota. Short-bull was one of the leaders in the Ghost Dance outbreak in 1893 and fought an en-

gagement with the United States troops at the Catholic Mission near the present site of the Indian agency. The pictures represent the Sun Dance of forty years ago. The green circle in the center of each is the windbreak of fresh cottonwood boughs within which the ceremonies of the Sun Dance were performed. In one of the circles figures are seen performing the famous torture feature of the dance, in which devotees were suspended by cords passing through loops cut in their skin. Another phase of this torture is shown in the second picture, where one of the Indians is seen outside the circle dragging four buffalo skulls by cords run through loops cut in the skin of his back. The ceremony requires that he continue to drag these until the skin is torn loose. In the center of this painting, suspended from the Sun Dance pole, are figures of a man and a buffalo, drawn quite out of proportion as is often the case in Indian art. The camp of the assembled people is indicated by the surrounding tipis, the typical tribal decorations of which are well shown. These paintings were collected by Dr. J. R. Walker, whose account of "The Sun Dance and Other Ceremonies of the Oglala Division of the Teton Dakota" has just been issued as Volume XVI, Part II, of the *Anthropological Papers of the American Museum of Natural History*.

It is interesting to compare with familiar West Indian fishes a small exchange collection recently received from the Museu Nacional at Rio de Janeiro. A queen trigger fish (*Balistes vetula*) which is in this collection has a bearing on the general distribution of fishes by ocean currents. It belongs to a group of small-mouthed, leathery-skinned fishes. Sluggish by nature, they often drift, especially when young, great distances in ocean currents. The queen trigger fish is one of the most gaudily colored of the trigger fishes, common in the West Indies, abundant about Bermuda, where it is known as "queen turbot," and also found in the South Atlantic and Indian oceans. No similar species occurs on the west coast of America although many tropical fishes are represented on both Atlantic and Pacific coasts, evidence of a former sea connection. In 1913, Mr. Robert C. Murphy brought back a queen trigger fish (apparently of a different race from those found in the West Indies) from South Trinidad Islet, six or seven hundred sea miles

east of Brazil. This aroused an interest in the variation of the species over its great range. The queen trigger fish was first described from Ascension Island; and in 1916 Mr. Murphy obtained an Ascension Island specimen through the courtesy of Major H. N. Bennett, then commandant at the island. The one from Rio gives us another link in the chain of evidence bearing on the problem of its distribution.

MR. KARL P. SCHMIDT, research assistant in the department of herpetology in the American Museum, was called to active service in the United States Army in early March.

IN the New York Botanical Garden's system for entertainment of visitors, parties are met at the door of the museum building by an instructor at three o'clock on every weekday afternoon and are escorted over various parts of the Garden. Beginning Monday, the routes differ each day as follows: Hemlock Forest, Mansion, and Herbaceous Garden; Pinetum; Fruticetum and North Meadows; Deciduous Arboretum, Public Conservatories, Range 2, Nurseries, and Propagating Houses; Public Conservatories, Range 1; Museums.

APRIL 3 was the birthday of Mr. John Burroughs, author and naturalist. This day, on which eighty-one years ago there was given to the world a child with idealistic, dreaming, nature-loving tendencies, may become an important one in the social history of the United States by its transfusion each year of something of these same qualities into the youth of the country. Already the date has been adopted as an annual "Bird Day" by several states of the Union and we can foresee that the movement is likely to continue. This is not only because of the effect of many years' use of his books for supplementary reading in the schools, or because of the good work of Houghton Mifflin Company, in publishing *Nature Notes*, a small magazine for the use of "Burroughs Nature Club" members throughout America, but especially because of the genuineness and charm of the nature presented in Mr. Burroughs' writings—owing to his own profound interest. His opening sentence in *The Summit of the Years* is, "The longer I live the more my mind dwells on the beauty and wonder of the world."